



Going concern, COVID and bankruptcy prediction: in Italy identified valid forecast ratios of bankruptcy prediction

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Abstract

In this paper, a theoretical and operational analysis was carried out on the issue of going concern. First of all, from a theoretical point of view, the subject of going concern has been examined in-depth to explain how the Covid-19 health emergency has impacted the companies' ability to carry out their activities shortly. It also achieves this aim by implementing operational research having as its object forty companies belonging to three macro-sectors: industrial, financial services and non-financial services, whose stocks make up the Italian stock exchange index Ftse Mib (Financial Times Stock Exchange Milan. The FTSE MIB is the benchmark stock index in Italy. It consists of a basket of 40 stocks on the Euronext Milan and Euronext MIV Milan markets identified by capitalisation, trading volume and sector).

The theoretical and operational analysis of the concept of going concern was carried out considering, also, the bankruptcy alert indices identified by the Italian National Council of Chartered Accountants and Accounting Experts. These indicators were introduced by Italian legislation with the entry into force of the new Code of Corporate Crisis to identify possible economic and financial instability situations before the state of crisis. The research, as mentioned above, was carried out using the alert indices recognised by the National Council of Chartered Accountants and Accounting Experts. This research emerged that these indices are actually predictive of a company crisis. It also completed the study illustrated in this paper by comparing the results of the bankruptcy's predictive alert indices and Altman's Z-score. It reached the trends identified by the alert indices with the results obtained from Altman's Z-score, and from this comparison, it can see that the final results are similar. The comparison between the alert ratios illustrated by the National Council of Chartered Accountants and Accounting Experts and the results of Altman's Z-score allows us to affirm two observations: undoubtedly, the alert ratios are characterised by a high predictive validity regarding the bankruptcy of companies and, in addition, that these ratios lead to similar results to those that can obtain by applying Altman's Z-score. In this paper, a theoretical and operational analysis was carried out on the issue of going concern. First of all, from a theoretical point of view, the subject of going concern has been examined in-depth to explain how the Covid-19 health emergency has impacted the companies' ability to carry out their activities shortly. It also achieves this aim by implementing operational research having as its object forty companies belonging to three macro-sectors: industrial, financial services and non-financial services, whose stocks make up the Italian stock exchange index Ftse Mib (Financial Times Stock Exchange Milan. The FTSE MIB is the benchmark stock index in Italy. It consists of a basket of 40 stocks on the Euronext Milan and Euronext MIV Milan markets identified by capitalization, trading volume and sector).

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Keywords: Going Concern, Bankruptcy Prediction, Bankruptcy Prediction Ratios

INTRODUCTION

The health emergency experienced in 2020 had a significant moral and economic impact on families and businesses. These have had to adapt their daily lives, sometimes incurring costs. Many families had to buy devices and set up an Internet connection to enable their children to attend classes remotely. While companies, to continue their activities, have adopted tools to implement Smart Working and, where possible, adapted their working facilities to the new health and hygiene regulations to ensure more excellent protection and safety for employees. Together with the freezing of activities, these measures have hurt financial resources, sometimes forcing companies to lay off their employees. This inevitably negatively affected households who, faced with lower income, contracted their consumption, thus initiating a negative economic cycle. The decrease in their consumption caused a drastic drop in the production activity of the companies, resulting in a decline in turnover and consequently in the operating result and liquidity. All this had repercussions on the companies' ability to continue their activities shortly.

For this reason, it was considered interesting to assess the effects that this pandemic has had on companies' accounting statements using the warning indicators identified by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) following the introduction of the new business crisis code into Italian law and comparing the results with Altman's historical model. To better understand the results obtained from the study, the first paragraph briefly illustrates the national and international regulations on going concern. Then, in the second paragraph, the alert procedures introduced by the Corporate Crisis Code are explained. The composition, thresholds and assessment of the Alert Indexes identified by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) are examined. Finally, the study was conducted by comparing the indicators calculated on the financial statements for the first half of 2019 and 2020 of the listed companies whose securities form the reference basket for calculating the Ftse Mib. To better analyse the results, it was deemed necessary to reclassify the companies into three macro-sectors: industrial, financial services, and non-financial services. Through the analytical study, it was, therefore, possible to identify the main balance sheet items impacted by the pandemic, identify the types of companies that suffered the most from the adverse effects, and demonstrate the validity of the alert indexes.

1) GOING CONCERN, COVID AND BANKRUPTCY PREDICTIVE RATIOS

In recent years, markets have become increasingly volatile, calling into question the future of many companies, which is partly attributable to the Covid-19 pandemic and the subsequent economic crisis. In this context, the need for a more careful assessment of going concern arises. This terminology refers to a company's ability to continue operating in the foreseeable future. This concept implies that the company must be in economic and financial equilibrium (European Commission, 2011). To achieve economic stability, the business must produce positive results, i.e. that revenues from operations exceed costs. On the other hand, monetary balance requires good management of cash inflows and outflows. Therefore, the company must be able to meet its liabilities and simultaneously realise its assets (Zareh Asatryan Z., Castellon C. & Stratmann T., 2018). Adherence to both balances is crucial since a company that is highly profitable but has significant financial difficulties could be considered by management as inadequate to continue as a going concern for the foreseeable future (Yanto E, Ak S.E., Ak M.& Monifa S.,2022). In assessing going concern, attention is paid to a further aspect, namely the company's ability to fulfil stakeholders' expectations, especially those of employees, shareholders and investors. (Marcello R., (2015))

The importance of the principle of going concern dates back to the 1970s or instead to the birth of the Accounting Standards Committee and is considered a cardinal principle not only by international regulations (IAS1) but also by Italian accounting standards (OIC11) and by Article 2423 bis of the Italian Civil Code resulting from the transposition of Article 31(1)(a) of Directive 76/660/EEC.

However, the subject of going concern is not only regulated in the area of financial statement preparation but also the area of financial statement auditing with the International Standard on Auditing 570 transposed in Italy as *Isa Italia 570*. The latter considers three figures to be of particular importance in evaluating and monitoring going concern: directors, auditors, and the statutory auditor (Zambon S, (2002)).

Going concern is not an absolute presumption but a condition that must verify, and compliance with this principle must be declared and concretely ascertained. (Beccaceci B. et al., 2016). The international regulations (paragraph 25 of IAS 1) and *Isa Italy 570* hold that the responsibility for the assessment of going concern always lies with the management and that the management assumes this responsibility through the preparation and approval of the draft financial statements for the financial year (Wagenhofer A., (2006)). Regulations do not require proof of going concern. However, some jurisdictions, such as the U.K. and the U.S., require management to prepare a statement setting out the reasons and beliefs based on which going concern is deemed to exist (IAASB, 2009).

The task of determining the existence of going concern is entrusted to management because it is believed to be the body with all the past and future information necessary to make a careful assessment (Novitawati H., (2021)). International accounting standards (Paragraph 24 IAS 1) and *Isa Italy 570* consider that management must, in the valuation process, consider all information relating to the 12 months following the closing of the financial

statements. This timeframe is consistent with Italian (OIC 11) and international (IAS 1) accounting standards, which hold that it must assess the company's ability to continue as a going concern concerning at least 12 months after the end of the financial year (IASB).

Management will have to analyse both quantitative and qualitative information such as the history of the company, its ability to meet its defined plans and obligations, the amount of financial resources at its disposal and its present and future profitability (Mulyawati A. & Munandar A., (2022)). The Italian national accounting standards (OIC Principle No. 29) pay particular attention to future information, stating that directors are obliged not to limit themselves to the analysis of final data and facts but to analyse events occurring after the financial year. After this, causes for the dissolution of the company may occur, such as the reduction of the capital below the legal minimum, or a deterioration of the financial position or the operating result to such an extent that the company's ability to continue as a going concern in the future may be jeopardised (Daniel T., (1968)).

The occurrence or non-occurrence of the going concern assumption leads to adopting different classifications and valuation criteria for balance sheet items. This principle is considered to have both a formal and a substantial impact on the preparation of financial statements: significant in that going concern is a fundamental principle for the preparation of financial statements, legal in that it affects the mandatory balance sheet and income statement. If the company is in good health and conducts a successful business, assets and liabilities will be entered into the balance sheet, considering that it will be able to realise its activities and meet its obligations (Wolk et al., (2001)).

On the other hand, if the company is in such a difficult situation that there is no going concern for true and fair representation, it will apply liquidation criteria. For example, the company will have to value fixed assets no longer considering their useful life and recoverability but realisable value.

However, Italian law (Art. 2487 of the Italian Civil Code) and international law (para. 25 IAS 1) allow drawing up financial statements using operating criteria even if the shareholders' meeting decides to adopt the instrument of the company's provisional financial year. In such a case, although the company is subject to bankruptcy proceedings, it is considered, since its capital is still capable of producing income, of maintaining the going concern requirement. This principle is also recognised for that branch of the business that is kept operational by the liquidator pending the sale of the business.

The regulations (Art. 2423 bis of the Italian Civil Code, Art. 2290 of the Italian Civil Code and IAS 10 Paragraph 4) also state that the transition from operating to liquidation criteria must take place when the company no longer represents a functioning production system and therefore an entity capable of producing income (Musvoto S. W. & Gouws D. G., (2011)). The closure of the business causes the economic disaggregation of the company, which is no longer considered an entity but as a set of different assets, the sale of which will be used to obtain the resources necessary to extinguish the obligations taken on. At the same time, any residual sums will be distributed among the shareholders. For the application of the liquidation criteria, it is necessary that the cessation of the activity be definitive (Wagenhoferb A. & Göxa R.F., (2009)) while in the case of continuation, even if in a reduced amount, it must apply the operating criteria.

Italian law also places several disclosure obligations on the directors concerning the outcome of the going concern assessment. First of all, it puts the obligation to include in the Notes to the Financial Statements an indication of the valuation criteria adopted in the preparation of the financial statements (Article 2427 of the Italian Civil Code) and to disclose in the management report any risks that may call into question the company's ability to carry out its business shortly (paragraph 1, Article 2428 of the Italian Civil Code).

Suppose management identifies facts or circumstances that lead to significant uncertainties regarding the existence of going concern. In that case, it must disclose this in the notes to the financial statements and in the management report. This must be done even if insignificant uncertainties or doubts are identified, which do not affect the validity of the going concern. On the other hand, if management believes that the going concern does not exist, it must indicate the reasons for this and the different valuation criteria adopted to evaluate the various items in the financial statements is verified not only by management but also by the board of auditors and the auditors (Behn B., Kaplan S. & Krumwiede K., (2001)).

The work of the management is subject to dual internal and external control. Internal control is carried out by the Board of Statutory Auditors, which can, however, be replaced by the Management Control Committee or the Supervisory Board. These bodies can ask the management for all information regarding any situations and events that could jeopardise the company's ability to continue its business (Blay A.D., & Geiger M.A., (2013)).

The external audit, on the other hand, is performed by the auditor, who, after assessing the existence of going concern and the proper application of this principle and management's accounting policies, must express an opinion on the financial statements with reasonable assurance (Kaplan S.E. & Williams D.D., (2012)).

Internal and external auditors also must exchange all information necessary to make such an assessment (Geiger M.A & Rama D. V., (2006)).

Particularly complex is the activity of the auditor who, to carry out his training, must gather a series of evidence necessary to conclude as to the existence or non-existence of significant uncertainties concerning past or future situations or events that may call into question the going concern (Ittonen K., Tronnes P.C. & Wong L.,

(2017)). It must carry out this control activity throughout the audit procedure. To do so, the auditor analyses a number of management, financial and other indicators provided for in paragraph 8 of Isa Italy 57. Examples of financial indicators are operating losses, cash flows and capital deficits. The auditor must analyse the historical trend of these indicators and not the single value to understand better the company's financial situation (Lepitkaia L., (2022)).

Management indicators can be either internal or external to the company. Internal management indicators are the loss of one or more members of management and the failure to restore them and any difficulties with employees. External management indicators are the loss of key customers, markets, concessions, suppliers and distribution contracts. Such events may create future situations critical enough to jeopardise going concern (Kuruppu N., Lasward F. & Oyelere P.,(2012)).

Then there is a third, more generic category of indicators that includes new regulations, legal disputes, and environmental or other catastrophes such as Covid-19.

After a careful analysis of the evidence, the auditor will be able to express an opinion on the financial statements (Hossain M., Raghunandan K. & Rama D. V., (2020)). If there are no doubts about the company's ability to continue as a going concern, the auditor will express a favourable opinion. If, on the other hand, there are significant uncertainties, the view may be: unmodified if management has disclosed this adequately in the financial statements; qualified if the information provided is inadequate or incomplete; adverse or unable to express an opinion if the required data is not provided. On the other hand, if the auditor finds no going concern he will be required to express an adverse opinion (Kinnart B.m Vandenhoute M.L. & Breesch D, (2022)).

Finally, it is essential to highlight that in Italian law, the role of the administrative and internal and external control body has become even more complex due to the revolution in Italian bankruptcy law that took place in 2019. This led to the entry into force of the Business Crisis and Insolvency Code which provided for several novelties, including:

- The introduction of the 2nd paragraph of Article 2086 of the Civil Code, which places on the entrepreneur the obligation to set up an accounting, organisational and administrative set-up suitable to allow for the timely detection of the lack of going concern and the occurrence of business crisis;
- Greater accountability of directors
- The attribution of new control functions to auditors and auditors, including examining warning indicators.

All these novelties have the common objective of ensuring the going concern and will be the subject of specific examination in the next section.

2) PROCEDURES AND ALERT RATIOS OF BANKRUPTCY

With the continuous evolution of the market and the economic system, there has been an awareness of how going concern is a condition of extreme importance and a value to be preserved as much as possible. This has also been perceived at the Italian and international regulatory levels.

At the European level, the Restructuring and Insolvency Directive (Directive 2019/1023 of 26 June 2019) has been issued, introducing novelties to simplify and make exoneration, restructuring and insolvency procedures more efficient.

In order to harmonise with the European regulations, the Italian legislation introduced the Business Crisis and Insolvency Code, thus replacing the Bankruptcy Law of 1942 and the Over-Indebtedness Law of 2012. It should note that the new legislation has not yet entered into force, except for the amending provisions of the Civil Code, which are in force as of 16 March 2019. The health emergency justifies this delay; however, with Law Decree No. 118 of 24 August 2021, the entry into force was set for 16 May 2022, and it postponed the PNNR2 decree to 15 July. Several novelties were introduced by the Code of Corporate Crisis and Insolvency to protect the going concern. First, a definition of business crisis and insolvency has been introduced. Article 2 of the regulation defines a crisis as a situation in which a company shows inefficiencies in its management activity. At the same time, the resulting economic and financial failure could lead to insolvency. Therefore, the state of insolvency is more severe than the state of crisis. Its assessment must be made not only based on the current situation but also from a prospective perspective and considering all economic, financial, and asset components. In addition, the assessment of insolvency focuses mainly on the financial aspect, i.e. on the possibility, manner and timing of fulfilling the company's obligations (Aziz A., Emanuel D. & Lawson G., 1988). The default can be seen as a clear manifestation of insolvency.

One of the objectives of the new business crisis and insolvency code is to encourage entrepreneurs, professionals, suppliers, and customers to adopt a series of behaviours to keep the company alive, thus avoiding liquidation proceedings and encouraging those aimed at reorganising the company. But the main objective is to anticipate the moment when the company crisis is detected and dealt with as early as possible. This is because the

entrepreneur usually tends to procrastinate in seeing the problem. This can sometimes lead directly to identifying a state of insolvency that can only resolve through bankruptcy or an arrangement with creditors.

The Business Crisis and Insolvency Code has also introduced two new instruments to implement the control functions of auditors and auditors and make directors more accountable. These tools are the assisted crisis resolution procedures and the alert procedures; as can be deduced from their name, the latter aims to alert and then highlight potential symptoms of a company crisis. These procedures, in fact, place on internal and external control bodies the obligation to report by fax, pec or registered mail any signs of a problem that can only be detected if specific indices exceed certain thresholds (Borella L., 2018). It must send this report immediately to the directors. It must contain a justification or indicate any expected facts that could, shortly, represent a threat to the going concern. Within 30 days of the report, the administrative body must verify whether the risks identified by the control body exist, notify the latter and, within the following 60 days, prepare measures to overcome the state of crisis. Subsequently, the control body must verify whether the directors have taken the corrective actions and if not, it must report this to the Crisis Resolution Body. This body has the function of supporting the entrepreneur in resolving the crisis by trying to reach an agreement with creditors.

Crises may also be communicated to the administrative body by the Inland Revenue and Collection Agency or by the Social Security Institutions if tax and social security debts exceed certain thresholds. If the administrators fail to settle these debts, the entities mentioned above must notify the Crisis Resolution Board.

These two procedures are intended to incentivise the entrepreneur to organise his business in such a way as to safeguard the going concern (Chi D.J., De Shen Z., (2022), Beryansyah A., Arrozi M.F., (2022) Beryansyah A., Arrozi M.F., (2022)). In support of this, the legislation introduced several organisational obligations as of 16 March 2019. The entrepreneur now must make commitments that are proportional to the assets and financial resources at his disposal and is obliged to adopt an administrative, organisational and accounting structure that is suitable for quickly detecting and eliminating possible states of crisis (Casarano F., (2020) Beryansyah A., Arrozi M.F., (2022)).

If taking all these measures fails to resolve the crisis, it will be necessary to initiate other procedures such as composition with creditors, certified reorganisation plans and restructuring agreements.

Playing a pivotal role in the alert procedures are the internal and external auditors, who are entrusted with analysing so-called alert indicators. These indicators have been developed by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC), which has defined the methods of calculation and, for each sector, the thresholds that must respect in order not to represent a sign of crisis.

The National Council of Chartered Accountants and Accounting Experts considers that the first two elements to be analysed are net worth and the debt service coverage ratio (henceforth DSCR).

* Shareholders' equity is a crisis indicator when it becomes harmful or, for corporations, below the legal limit imposed. This situation can occur when the company reports significant losses and constitutes a threat to going concern until the legal minimum or positive value is restored, e.g., recapitalisation. Failure to regain capital is, in fact, a cause for the dissolution of the company.

* If the equity is positive, the auditor must proceed with analysing the six-month debt service coverage ratio. This indicator shows the company's ability to meet its financial obligations, i.e. the financial sustainability of the company's debt. This capacity is analysed in perspective terms. The index is given by the ratio between the company's operating cash flows and the cash flows used to repay the debt estimated for the next six months. Should this ratio assume a value greater than one, going concern is deemed to exist. It is also important to note that this ratio is only used if the auditing body considers the future cash flows estimated by the directors to be reliable.

The National Council of Chartered Accountants and Accounting Experts stipulates that if the shareholders' equity is positive and above the statutory minimum, but the DSCR is less than 1 or it is impossible to calculate it, the assessment of the going concern is made by analysing five other indicators. Their evaluation and the relative judgement will vary depending on the sector to which the company under analysis belongs.

The additional indices identified by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) are:

1. The sustainability index of financial charges = Financial charges / Revenue.

This indicator is given by the ratio between the sum of interest expenses and financial charges and Revenue from sales and services.

2. The equity adequacy ratio = Equity/ Total Debts.

For the amount of this indicator, it is necessary to subtract from equity the dividends resolved on the result for the year and the receivables from shareholders for payments still due. On the other hand, the denominator consists of all debts shown in the statutory balance sheet and accrued liabilities and deferred income.

3. The cash flow return ratio of assets= Cash flow/ Total assets.

The denominator is total assets. The National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) considers that the cash flow placed at the numerator should be calculated starting from the profit or loss for the year by adding non-monetary costs and subtracting non-monetary revenues. Examples of non-monetary costs are depreciation and amortisation, write-downs and provisions for risks, capital losses and provisions for severance pay. On the other hand, non-monetary revenues are internal works, self-constructed works, revaluations of participations and capital gains. It is therefore considered when operating cash flow should be used.

4. The current ratio= short term assets / short term debts

The numerator consists of the asset items due within the next 12 months, i.e. the short term assets. On the other hand, the denominator is all accounts payable, accrued expenses and deferred income due within the next 12 months, i.e. short-term liabilities.

5. The index of social security and tax liabilities = Social security and tax liabilities / total assets.

This indicator has as its numerator the sum of tax liabilities and social security liabilities on the liabilities side of the statutory balance sheet. The denominator, on the other hand, is the total assets.

As can be seen, the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) developed these indicators considering the balance sheet (Article 2424 of the Italian Civil Code) and profit and loss account (Article 2425 of the Italian Civil Code) layouts provided by the Italian Civil Code. However, micro-companies will also have to adopt the warning indicators. These companies prepare their financial statements in abridged form, and companies that prepare their financial statements according to IFRS. The latter will have to consider the equivalent balance sheet items in the international financial statements and, specifically, in the calculation of shareholders' equity they will have to exclude all IFRS reserves, such as stock option reserves and fair value reserves, but especially the reserve for expected cash flow hedges. While micro-companies and companies that prepare condensed financial statements will have to calculate the alert ratios based on the accounting situation used when designing the annual financial statements (The National Council of Chartered Accountants and Accounting Experts, (2019)).

To best understand the company's situation, the auditing body must jointly assess these ratios. Furthermore, to state with certainty that the company can continue as a going concern, the ratios must meet these constraints:

- The sustainability index of financial charges < to the indicated limit;
- The equity adequacy ratio > to the indicated limit;
- The cash flow return ratio of assets > to the indicated limit;
- The current ratio > to the indicated limit;
- The index of social security and tax liabilities < to the indicated limit.

When assessing these indicators, the auditing body must also take into account that the limits, as illustrated in Figure 1, differ according to the sector of the company.

Sector	Alert level				
	Financial Charges/ Revenue%	Equity/Total Debts %	Short term assets/ short term debts %	Cash flow/ Total assets %	Social security and tax liabilities/Total assets %
(A)AGRICULTURE, FORESTRY AND FISHING	2.8	9.4	92.1	0.3	5.6
(E)MINING, (C) MANUFACTURING, (D) ENERGY AND GAS PRODUCTION	3.0	7.6	93.7	0.5	4.9
(E)WATER SUPPLY, SEWER NETWORKS AND WASTE, (D)ENERGY AND GAS TRANSMISSION	2.6	6.7	84.2	1.9	6.5
(F41)BUILDINGS CONSTRUCTION	3.8	4.9	108.0	0.4	3.8
(F42)CIVIL ENGINEERING, (F43) SPECIALIZED CONSTRUCTIONS	2.8	5.3	101.1	1.4	5.3
(G45)WHOLESALE AND RETAIL TRADE OF MOTOR VEHICLES, (G46) WHOLESALE TRADE, (D)ENERGY AND GAS DISTRIBUTION	2.1	6.3	101.4	0.6	2.9
(G47) RETAIL TRADE, (I56)BAR & RESTAURANTS	1.5	4.2	89.8	1.0	7.8
(H)TRANSPORT AND STORAGE, (I55) HOTEL	1.5	4.1	86.0	1.4	10.2
(JMN)BUSINESS SERVICES	1.8	5.2	95.4	1.7	11.9
(PQRS) HUMAN SERVICES	2.7	2.3	69.8	0.5	14.6

Figure 1. Alert levels related to the business sector

Source: National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC), Report 'Business Crisis. The alert ratios'.

However, the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) has specified that non-compliance with these indicators may reasonably suggest a state of crisis. But even if it did not meet all the limits, it could not declare with absolute certainty that the company does not meet the going concern requirement. According to the council, this would be the case when, in addition to non-compliance with specific thresholds, events occur such as the inability to meet its obligations in the six months following the assessment, repeated late payment of debts, or there are causes other than insolvency that jeopardise going concern (NCCAAE, Italian acronym CNDCEC, 2019).

However, the obligation to transpose Insolvency legislation (EU Directive No. 2019/1023) by 15 July 2022 prompted the government to consider a temporary suspension and possible future postponement of the application of these procedures and warning indicators. This was due to the failure to establish a system to integrate them and because in the aftermath of the pandemic, companies were faced with such difficulties that they were unable to organise themselves and adopt these procedures in the short term. For this reason, the government is devising alternative, much simpler criteria involving the evaluation of new alerts every three years.

3. THE IMPACT OF COVID 19 ON THE GOING CONCERN OF COMPANIES BELONGING TO THE INDUSTRIAL, FINANCIAL SERVICES AND NON -FINANCIAL SERVICES MACRO

The year 2020 was unusual as a state of health emergency characterised it due to the global spread of Covid-19. The rapid circulation of this virus and the high mortality rate led the World Health Organisation to declare a 'Pandemic' status on 11 March 2020. Faced with this context, the governors of European and non-European countries have adopted restrictive solid measures, the most significant of which are the blockade of non-essential activities and lockdown of the population. These measures have severely limited the transmission of the virus. Still, they have also had devastating economic effects in several countries and Italy, where there was already a weakness in the economic cycle characterised by low household confidence. The restrictions put in place by governments have had consequences on the consumption activity of households, but also on the production and investment activity of businesses, thus calling into question their future (Brygala M., 2022) Kim H., Cho H., Ryy D., (2022), Le T., (2022),), Le, T., et al.:(2018)).

Faced with this context, it decided to demonstrate how the health emergency has impacted the business continuity of Italian companies belonging to three macro sectors: Industrial, non-financial, and financial services. However, before setting out the methodology and the results obtained from the study, it is essential to outline the literature analysed briefly.

Identifying the state of business crisis has been the subject of several studies conducted since the early 1900s that can be distinguished into two categories: qualitative models and quantitative models (Bellorary J.K, Giacomino D.E. & Akers M.D., 2007). The latter is based on mainly financial information, while qualitative models are based on the internal company information of a non-financial nature (Du Jardin P., Veganzones D. & Sèverin E., (2019)). According to qualitative models, analyses based only on financial data do not allow a complete understanding of the company's conditions (Xu X., Yang L.L & Zhang J.H., (2022)). Such information has to be supplemented with other

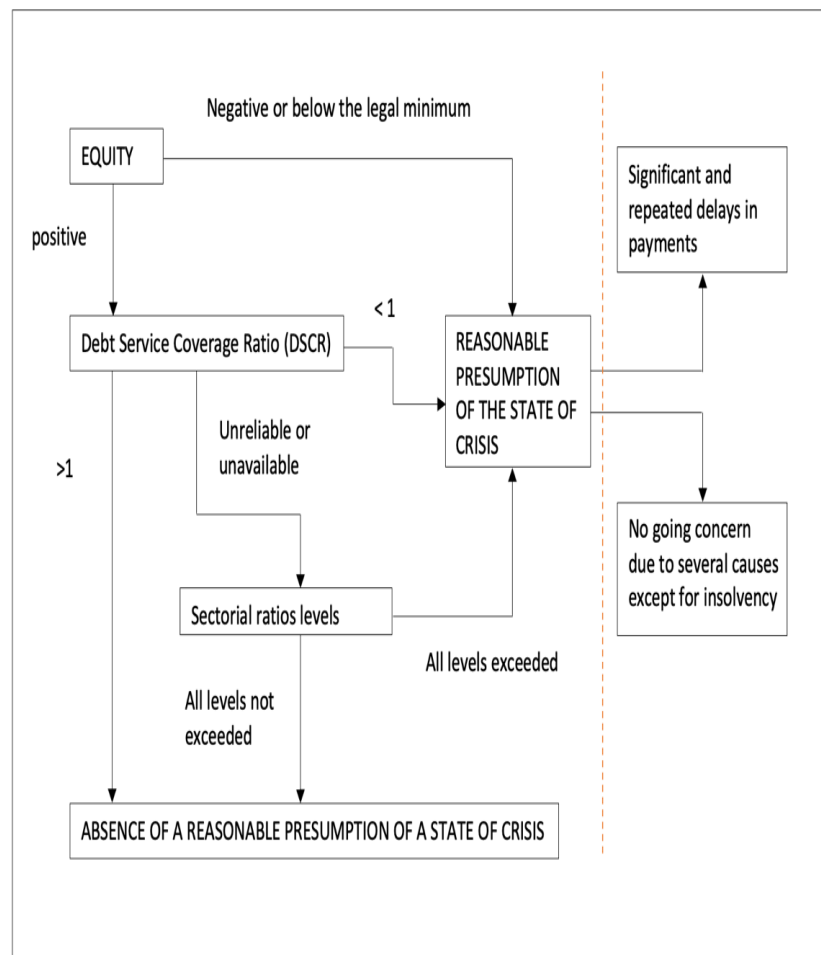


Figure 2. Indicator's framework in the assessment of the state of crisis

Source: The National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC (2019), Report 'Business Crisis. The alert ratios'

information about the company such as the sector it belongs to (Nam C., Kim T., Park N. & Lee H., 2008), possible losses of market share, situations of serious equity and financial instability (Charitou A., Neophytou E. & Charalambous C., 2004), and production, accounting or commercial, organisational inefficiencies (Nayat S.M. & Rout M., (2022)). Of particular importance among qualitative models are the "Ten Commandments" (Ross J.E & Kami H. J., (1973)) but above all, the A-score model created by J. Argenti in 1976 (Alaka H.A et al., (2018)). The latter identifies the failure process as an exact procedure divided into three stages: Defects, mistakes and symptoms (Argenti J., (1976)).

Argenti believes that Defects that can lead to insolvency include: mismanagement by management; accounting defects such as non-existent or inadequate budget control systems, non-existent cash flow plans (Brogaard J., Li D. & Xia Y., (2017)) and a costing system; and failure to respond adequately to change. (Argenti J., (1976)).

The mistakes made identified by Argenti are three: excessive leverage caused by the lack of financial capacity and inexact cash flow planning; over-trading because the company only sets quantitative but not profit goals; and finally, starting a hazardous project that, if unsuccessful, can cause serious problems. Argenti also believes that the consequences of these fatal errors are not visible until five years after their completion. (Argenti J., (1976))

The last stage of the procedure occurs when the Symptoms of failure become visible, and business collapse will only happen if these symptoms become severe. Argenti classifies these symptoms into:

- Financial: which usually only appear in the last two years of the bankruptcy process
- Creative accounting: which only occurs when modified and optimistic data are made public
- Non-financial: i.e. qualitative information such as loss of market share, salary freezes, etc.
- Nose Dive: financial and non-financial signals become recognisable to observers only at the end of the bankruptcy process. (Argenti J., 1976)

This model assigns a score to each component of the three stages, and if the sum, or A-score, exceeds a score of 25, the situation should be considered problematic. Companies with a high risk of insolvency score between 35 and 70; conversely, a value between 0 and 18 indicates a company that is not at risk.

Argenti also argues that the following also contribute to business failure: bad luck causes 1% of failures; mismanagement causes 99% of failures, and fraud hardly causes failure.

Quantitative models, on the other hand, are based on indicators and fall into two categories: empirical and theoretical (Zhou L., 2013). The latter have never found application due to their simplicity (Ahrony J.C, Jones C. & Swary I., (1980); in fact, models of the former type are usually adopted, among which the models of William Beaver (1966), Edward Altman (1968), James A. Ohlson (1980) and Zmijewski (1984) are of particular importance (Baldwin J. & Gleze G., (1992)).

The pioneer of these studies was Beaver, who, in his analyses, defined five indicators capable of identifying the state of a company's crisis: current liquidity ratio, the ratios of cash flow to total assets, operating cash flow to total debt, of total debt to total assets, and net income to total assets (Beaver W.H., 1966). Beaver also argued that the most significant index for predicting bankruptcy was the cash flow ratio to total debt. At the same time, the second-best was the ratio of net debt to total assets (Beaver W., McNichols H., Maureen F. & Rhie J., (2005)). He also recognised the significant limitation of this model, namely that it was conducted by analysing one index at a time as a univariate model. (ACCA Global, (2008))

In subsequent years, multivariate models were developed to provide a more comprehensive analysis of the company's situation and compensate for the limitation of Beaver's model, including Altman's Z-score (Welch J. & Sobcsak E., 2017).

In 1968, Altman introduced the multiple discriminant analysis (Altman E., (1973)), i.e. a linear combination of several indicators that allows for a more precise distinction between bankrupt and non-bankrupt firms (Chen M. Y., (2011)). Altman analysed 66 listed companies (33 bankrupt and 33 healthy) using five index categories (Dakovic R, Czado C. & Berg D., (2010)): assets, leverage, solvency, profitability and liquidity and came up with the following equation (Altman E.I, (1968): The variety of these indices leads to identifying a score, i.e. the Z-score, and based on the value taken by this indicator, it can be argued whether or not the company is in good health (Altman E., Sieradzki R. & Tholon M., (2022)).

$$\mathbf{Z\text{-score} = 0.012 X_1 + 0.014 X_2 + 0.033 X_3 + 0.006 X_4 + 0.999 X_5}$$

- X_1 = working capital / Total assets;
- X_2 = Retained Earnings / Total assets;
- X_3 = Earnings before interest and taxes / Total assets;
- X_4 = Market value equity / Book value of total debt;
- X_5 = Sales / Total assets. (Altman E.I., 1968):

The Z-score obtained by solving this equation allows us to understand the situation in which the company finds itself. However, Altman highlighted an indirect relationship between the result and the probability of the firm's insolvency (Barboza F., Kimura H. & Altman E., (2017)). As the value is taken by the z-score decreases, the probability that the evaluated firm is insolvent increases; conversely, as the score increases, the likelihood of insolvency decreases (Pitera.R., (2019)).

To define the state in which the company under analysis is located, Altman identified three cutoffs for the Z-score:

1. score > a 2.99 indicates that the firm is in a relatively safe situation, and there is little likelihood of a financial crisis occurring. Essentially, the company is considered "not bankrupt";
2. score > or = 1.81, but = or < to 2.99 indicates a situation that needs to be monitored as there is a possibility of a financial crisis occurring. Altman calls this area between 1.81 and 2.99 zone of ignorance or grey zone;
3. A score < 1.81 indicates that the company is insolvent and, therefore, there is a high probability of a financial crisis occurring.

Since, in the grey zone, it was impossible to determine whether the company was insolvent or not, Altman carried out a further analysis that led him to argue that 2.675, the midpoint of the interval, is the optimal Z-score (Altman E.I., 1968). This value allows a distinction to be made between bankrupt and non-bankrupt firms (Karol T., 2019).

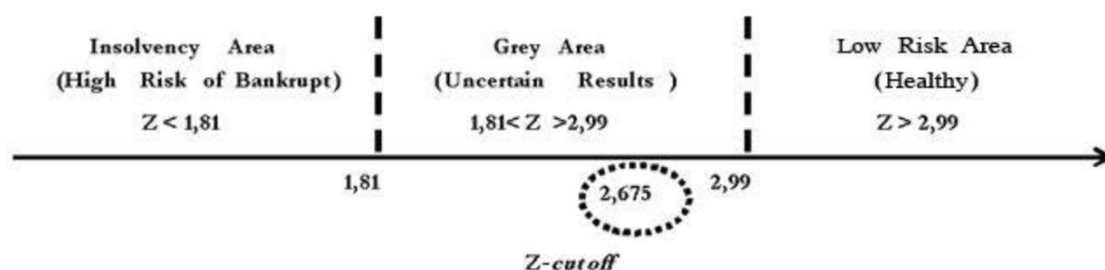


Figure 3.1 The Z-score Areas

Source: Danovi e Quagli (2008), Gestione della crisi aziendale e dei processi di risanamento. Prevenzione e diagnosi, terapie, casi aziendali

Infine, Altman valutò anche l'attendibilità dei risultati ottenuti dallo Z-score model e ne risultò che il grado di precisione nella previsione del fallimento aziendale è pari a 95% se l'analisi è condotta a un anno di distanza, 72% se a due anni e 52% se a tre anni. (Altman E.I., Haldeman R. & Narayanan, (1977)).

In later years, due to the simplicity and precision of his results, Altman's model was used by other scholars such as Ohlson and Zmijewski (Muminović S., (2013)).

Ohlson created a logit regression model based on an equation of 9 variables (Ohlson J.A; (1980):

$$O = -1.32 - 0.407 X_1 + 6.03 X_2 - 1.43 X_3 + 0.757 X_4 - 2.37 X_5 - 1.83 X_6 + 0.285 X_7 - 1.72 X_8 - 0.521 X_9$$

- Composed of the following variables: Size = log (Total assets/ GNP price-level index) (X_1);
- TLTA = Total liabilities / total assets (X_2);
- WTCA = Working capital/ total assets (X_3);
- CLCA = Current liabilities / current assets (X_4);
- OENEG = 1 if total liabilities exceeds total assets, 0 (X_5);
- NITA = net income dividend / total assets (X_6);
- FUTL = Funds provided by operation dividend / total liabilities (X_7);
- INTWO = 1 if net income was negative for the last two years, 0 otherwise (X_8);
- CHIN = Net Income variation = $(NI_t - NI_{t-1}) / (|NI_t| + |NI_{t-1}|)$ where NI_t is the net income for the most recent period. (X_9).

The cut-off point identified by Ohlson was 0.38, and the accuracy level was 99%. However, this model was criticised for being difficult to apply. (Wilson R. L. & Sharda R., (1994)).

In 1984, Zmijewski developed a further so-called probit model (Hyeongjun K., Cho H. & Ryu D., (2020), based on the following equation (Zmijewski M.E., (1984): $Z = -4.3 - 4.5 X_1 + 5.7 X_2 - 0.004 X_3$

- X_1 = net income/ total assets;
- X_2 = total debt/ total assets;
- X_3 = current assets/ current liabilities.

Zmijewski identified the cut-off point between solvent and insolvent companies as 0.50 (Grice J.S & Dugan M.T., (2003)). However, in this model, values above 0.5 indicate that the company is in a crisis (Shumway T., (2001)). Of the other studies carried out in later years, that of Serrano Cinca and Gutierrez Nieto (Serrano-Cinca C. & Gutiérrez-Nieto B., (2013) who developed a model designed to detect insolvency in the banking sector (Du Jardin P. & Séverin E.,(2011)).

It should note that many authors have pointed out that bankruptcy prediction requires a long-term analysis. (Ratajczak P., Swutwski D., Szulczewska Remi A.,(2022), Du Jardin, P. (2015), Cao, Y.,Kiu X., Zhai J.,

Hua S., (2022), Kitowski J, Kowal-Pawul A., Lichota W., (2022) María E. Pérez-Pons et al, (2022) ,Olson, D., Dursun L., Delen L, Meng Y.,. (2012), Chen M.Y. (2011)).

The literature review defined the methodology adopted to conduct the previous research. As a first step, the sample to be analysed was identified. Considering that the study is based only on first-half data, it was necessary to have half-yearly accounting information; for this purpose, only listed companies are obliged to prepare and publish interim reports. Therefore, it decided to analyse the 40 Italian companies whose shares make up the reference basket to calculate the Ftse Mib, the most crucial share index of the Italian stock exchange. This sample consists of companies, sometimes parent companies, belonging to different sectors such as banking, manufacturing, utilities, telecommunications, etc. However, two of these companies were excluded from the sample: Inwit because another company controls it under analysis, i.e. Telecom, and Mediobanca because it prepares its annual financial statements on 30 June and therefore, the comparison of a yearly report with the other half-year reports would have led to inconsistent results. The remaining 38 companies were then subdivided, using the classification of the Italian Stock Exchange website, the Ateco code (Italian code that differentiates manufacturing activities) and the Sea code, into three macro-sectors: industrial, financial and non-financial services.

	Company	Classification	Super Sectors	
		Description		
INDUSTRIAL macro sector	interpump Group	Retail of medical and orthopedic items in specialized shops	Health	19
	Atlantia	Holding activities engaged in management activities	Industrial products and services	
	Buzzi Unicem	Cement production	Buildings and materials	
	Campari	Distillation, rectification and alcohol mixing	Food	
	Cnh Industrial	Manufacture of agricultural tractors	Industrial products and services	
	Diasorin	Manufacture of pharmaceutical products	Health	
	Eni	Oil refineries	Oil and natural gas	
	Ferrari	Manufacture of motor vehicles	Automobiles and components	
	Fiat Chrysler Automobiles	Manufacture of motor vehicles	Automobiles and components	
	Interpump Group	Manufacture of other mechanical equipment and other machines of use	Industrial products and services	
	Leonardo	Manufacture of aircraft, spacecraft and related devices nec	Industrial products and services	
	Moncler	Granting of rights of exploitation of intellectual property and similar products (excluding works protected by copyright)	Household products, products for the person, Fashion	
	Pirelli & C.	Manufacture of tires and inner tubes	Automobiles and components	
	Prysmian	Manufacture of other electrical and electronic wires and cables	Industrial products and services	
	Recordati	Manufacture of medicines and pharmaceutical preparations	Health	
	Saipem	Construction of residential and non-residential buildings	Oil and natural gas	
	Snam	Transport by gas pipelines	Oil and natural gas	
	Stmicroelectronics	Manufacture of electronic components and electronic boards	Technology	
	Tenaris	Manufacture of seamless pipes and ducts	Raw materials	

Table 3.1 Companies in the industrial macro sector

Source: authors' elaboration

	Company	Classification	Super Sectors		
		Description			
NON FINANCIAL SERVICES Macro sector	A2a	Supply of electricity, gas, steam and air conditioning	Public services	EXCLUDED	6
	Enel	Supply of electricity, gas, steam and air conditioning	Public services		
	Hera	Supply of water, sewerage, waste management and remediation activities	Public services		
	Inwit	Information and communication services	Telecommunications		
	Italgas	Supply of electricity, gas, steam and air conditioning	Public services		
	Telecom Italia	Telecommunications	Telecommunications		
	Terna	Supply of electricity, gas, steam and air conditioning	Public services		

Table 3.2 Companies in the no-financial services macro sector

Source: authors' elaboration

	Company	Classification	Super Sectors		
		Description			
FINANCIAL SERVICES Macro sector	Azimut Holding	management of mutual fund and pension funds	Financial services	EXCLUDED	13
	Banca Generali	Monetary brokerage of monetary institutions other than Central Banks	Banks		
	Banca Mediolanum	Monetary brokerage of monetary institutions other than Central Banks	Financial services		
	Banco Bpm	Monetary brokerage of monetary institutions other than Central Banks	Banks		
	Bper Banca	Monetary brokerage of monetary institutions other than Central Banks	Banks		
	Exor	Activities of holding companies (Holding)	Financial services		
	Finecobank	Monetary brokerage of monetary institutions other than Central Banks	Banks		
	Generali	Activities of insurance agents and brokers	Insurance		
	Intesa Sanpaolo	Monetary brokerage of monetary institutions other than Central Banks	Banks		
	Mediobanca	Monetary brokerage of monetary institutions other than Central Banks	Financial services		
	Nexi	Other credit activities	Industrial products and services		
	Poste Italiane	Bancoposta activities	Insurance		
	Unicredit	Monetary brokerage of monetary institutions other than Central Banks	Banks		
	Unipol	Activities of insurance agents and brokers	Insurance		

Table 3.3 Companies in the financial services macro sector

Source: authors' elaboration

The industrial macro sector consists of companies operating mainly in the manufacturing industry, i.e. companies specialising in the construction of aircraft, motor vehicles, medicines and electronic components. It analysed these companies by adopting Altman's model and comparing it with the results obtained from the analysis of the alert indices identified by the National Council of Accountants. The analysis models were then defined, as it was not possible to apply the same methodology to all of them since the sample consisted of very different companies. While the examination of companies belonging to the financial sector was conducted using economic, financial and capital indexes specific to the health check of insurance companies, financial intermediaries and banks. The latter do not represent a multivariate model but rather indices that, if analysed simultaneously, make it possible to indicate whether or not there is going concern reasonably. The analysis of companies offering electricity, water, gas and telecommunication services, i.e. those companies belonging to the non-financial services macro-sector, was also carried out using these indices.

The ability to cope with a financial crisis depends not only on capitalisation but also on the availability of a sufficient level of liquidity to meet one's commitments (Falavigna G., (2012)). To understand the financial indicators, it was considered essential to analyse the balance sheet formats prescribed by the Bank of Italy for financial institutions and the relevant regulations: Basilea I, Basilea II and Basilea III. The capital and liquidity requirements introduced and made more stringent due to the financial crisis in 2008 were also analysed.

Banking groups and other non-insurance financial companies were analysed using capital, income, risk and liquidity indicators. In contrast, insurance companies were studied using capital, financial and income indicators, and technical insurance management indicators.

It should also emphasise that the analysis was conducted on consolidated financial statements, analysing the results and financial and balance sheet situations for the first half of 2020 and comparing them with those for the first half of 2019. This comparison was essential to understand whether a possible condition of economic instability was caused solely and exclusively by the pandemic or whether it was already in place.

We illustrate below the results obtained from the different methodologies adopted, also explaining the macroeconomic context in which the companies in the sample found themselves operating.

Results Industrial macro-sector

Company	Z-score			
	2019	2020	Diff.	Δ %
Amplifon	1,81	1,88	0,07	3,72%
Atlantia	0,48	0,28	-0,20	-42,11%
Buzzi Unicem	1,83	2,00	0,17	9,20%
Campari	3,48	2,89	-0,60	-17,18%
Cnh Industrial	1,28	1,11	-0,17	-13,51%
Diasorin	16,15	25,03	8,88	55,02%
Eni	1,37	0,82	-0,55	-40,15%
Ferrari	5,52	4,92	-0,60	-10,88%
Fiat Chrysler Automobiles (FCA)	1,03	0,78	-0,26	-24,89%
Interpump Group	3,35	3,04	-0,31	-9,30%
Leonardo	0,57	0,46	-0,11	-19,65%
Moncler	6,35	5,54	-0,82	-12,86%
Pirelli & C.	1,00	0,81	-0,20	-19,53%
Prysmian	1,40	1,48	0,08	5,78%
Recordati	5,68	4,85	-0,83	-14,60%
Saipem	1,08	0,58	-0,50	-46,54%
Snam	0,76	0,73	-0,03	-3,39%
Stmicroelectronics	2,86	3,54	0,69	24,11%
Tenaris	5,00	3,24	-1,76	-35,16%

Table 3.4 Z-score of companies in the industrial macro

pharmaceutical companies had a strong positive trend. In the face of the pandemic, increased the production and sale of drugs and specialised in the production of protective medical devices and respirators, but encountered problems related to the complexity and length of logistics chains. To cope with this emergency period and quickly reorganise their business, companies reduced labour costs by hiring freezes and using social shock absorbers, suspended or reduced directors' fees, and cut costs related to marketing, communication, and other non-core activities. Also fundamental to the economic recovery of these companies were the competitive strategies adopted and the aid granted by the government and banks.

As explained above, the analysis of the industrial macro sector was carried out using two different methodologies: Altman's Z-score model and the alert indices identified by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC)

As shown in the table, the analysis of companies conducted with Altman's model revealed that the Z-score generally worsened for almost all companies, except Amplifon, Buzzi Unicem, Prysmian Diasorin and STMicroelectronics. Specifically, the

The effects of the pandemic on the companies belonging to this macro-sector are not homogeneous but differentiated according to the sector in which the companies operate. Those most affected by the lockdown were companies belonging to the automotive, footwear, clothing and furniture sectors, even though these sectors represent Made's heart in Italy and enhance Italy's value worldwide. These are sectors that work mainly with foreign customers and have inevitably suffered a drop in sales due to the closure of Italian borders and the consequent blockade of tourism. Moreover, these are sectors mainly composed of small and medium-sized enterprises that, due to a shortage of human, financial and investment resources, we're unable to reorganise quickly and limit the adverse economic effects of this pandemic. The significant impact in these sectors is justified by their composition and reference market.

This sector also includes food, chemical-pharmaceutical, metallurgical and mechanical enterprises, which continued their activities by quickly reorganising themselves according to the new health parameters, thus guaranteeing the safety of employees and customers. In particular, the chemical-

Description	Cut-off	Z-score	Company
Company with low probability of crisis	Z-score > 2,99	25,03	Diasorin
		5,54	Moncler
		4,92	Ferrari
		4,85	Recordati
		3,54	Stmicroelectronics
		3,24	Tenaris
		3,04	Interpump Group
Company with low probability of crisis but situation to be monitored	2,675 < Z-score < 2,99	2,89	Campari
Company with medium probability of crisis and situation to be monitored	1,81 < Z-score < 2,675	2,00	Buzzi Unicem
		1,88	Amplifon
Company with a high probability of immediate crisis	Z-score < 1,81	1,48	Prysmian
		1,11	Cnh Industrial
		0,82	Eni
		0,81	Pirelli & C.
		0,78	Fiat Chrysler Automobiles (FCA)
		0,73	Snam
		0,58	Saipem
		0,46	Leonardo
		0,28	Atlantia

Table 3.5 Classification of industrial companies in relation to the Z-score

Source: authors' calculations

analysis of the latter two companies found a very low probability of a crisis, noting a Z-score higher than 2.99, and their improvement was consistent with the positive performance of the sectors to which they belong, i.e. chemical-pharmaceutical and electronics. In particular, the significant investments in the research, development, production and distribution of molecular tests for the detection of Covid-19 have allowed Diasorin to obtain important profitability of the activities (10.91%) and, thanks to the improvement in the management of current assets (44.69%), a high index of flexibility (39.11%) and independence from third parties (3833.17%). However, the increase in the z-score should also be attributed to the increase in market value that occurred following the launch of the serological test (+65.76%). While the increase in the z-score of STMicroelectronics from 2.86 to 3.5 is not justified by the increase in the profitability ratio (- 0.34 p.p.) but by the significant increase in market value (+54%). The other companies, on the other hand, achieved an improvement in the z-score solely due to the rise in the group's market value and undistributed operating profit.

Company	Working Capital to Asset ratio %				Retained Earnings to Total Assets %				ROA %				Market value equity to Book value of total debt %				Sales to Total Assets		
	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Δ%
Amplifon	-7,40	4,01	11,41	154,21%	15,42	17,75	2,33	15,13%	3,20	1,03	-2,17	-67,93%	213,84	224,97	11,14	5,21%	0,30	0,20	-32,81%
Atlantia	-1,08	2,34	3,42	316,63%	10,50	9,71	-0,79	-7,55%	2,87	-0,85	-3,72	-129,53%	29,60	16,25	-13,35	-45,11%	0,07	0,04	-39,63%
Buzzi Unicem	14,19	23,64	9,44	66,54%	47,23	50,32	3,10	6,56%	2,72	2,86	0,14	5,09%	109,68	113,35	3,67	3,35%	0,25	0,23	-6,07%
Campari	22,01	11,01	-11,00	-49,98%	46,41	46,04	-0,37	-0,81%	3,53	2,06	-1,46	-41,50%	379,93	314,50	-65,44	-17,22%	0,17	0,15	-11,61%
Cnh Industrial	46,85	48,45	1,60	3,42%	13,50	12,03	-1,47	-10,86%	2,11	-0,19	-2,29	-108,83%	29,59	21,57	-8,01	-27,08%	0,28	0,24	-16,99%
Diasorin	31,03	39,11	8,08	26,05%	58,51	62,06	3,55	6,07%	11,16	10,91	-0,25	-2,26%	2372,50	3833,17	1460,67	61,57%	0,35	0,34	-4,92%
Eni	7,46	5,46	-1,99	-26,74%	31,03	30,79	-0,23	-0,75%	3,80	-3,28	-7,08	-186,26%	71,55	40,49	-31,06	-43,41%	0,30	0,19	-35,36%
Ferrari	21,04	25,77	4,73	22,48%	25,49	22,14	-3,35	-13,15%	8,92	4,15	-4,77	-53,45%	708,16	650,67	-57,49	-8,12%	0,36	0,26	-29,62%
FCA	-8,92	-3,43	5,50	-61,59%	27,04	27,29	0,25	0,93%	2,62	-0,94	-3,55	-135,77%	26,33	20,10	-6,23	-23,67%	0,52	0,34	-33,26%
Interpump Group	21,29	26,71	5,42	25,43%	43,48	43,71	0,23	0,54%	6,89	4,31	-2,58	-37,46%	313,29	277,23	-36,06	-11,51%	0,38	0,30	-20,66%
Leonardo	-3,84	-3,17	0,67	17,48%	11,21	12,69	1,48	13,16%	1,75	0,84	-0,91	-51,85%	29,64	15,83	-13,81	-46,59%	0,23	0,23	0,40%
Moncler	17,59	20,57	2,97	16,90%	33,89	44,25	10,36	30,57%	4,85	-1,44	-6,29	-129,77%	873,19	759,06	-114,14	-13,07%	0,27	0,16	-39,11%
Pirelli & C.	1,72	8,48	6,76	391,96%	22,95	23,50	0,55	2,38%	3,18	-0,43	-3,60	-113,42%	59,75	42,45	-17,30	-28,95%	0,20	0,14	-31,27%
Prysmian	6,24	9,42	3,17	50,87%	22,11	25,99	3,88	17,53%	3,18	1,74	-1,44	-45,25%	59,78	74,76	14,98	25,05%	0,56	0,50	-9,65%
Recordati	11,80	11,66	-0,14	-1,17%	46,43	41,01	-5,42	-11,67%	11,18	9,31	-1,87	-16,77%	696,57	593,57	-103,00	-14,79%	0,34	0,27	-21,04%
Saipem	13,34	9,38	-3,96	-29,69%	11,96	13,21	1,25	10,49%	2,13	-6,29	-8,41	-395,63%	53,43	27,53	-25,89	-48,46%	0,37	0,32	-11,41%
Snam	-10,18	-7,56	2,62	25,72%	13,24	13,66	0,42	3,20%	3,29	2,93	-0,35	-10,67%	87,90	79,89	-8,01	-9,12%	0,06	0,05	-5,87%
Stmicroelectronics	27,01	0,23	-26,79	-99,17%	20,56	22,12	1,56	7,59%	2,70	2,36	-0,34	-12,64%	302,48	426,23	123,75	40,91%	0,34	0,33	-3,22%
Tenaris	0,25	0,23	-0,03	-10,55%	76,00	77,61	1,61	2,11%	3,29	-4,32	-7,61	-231,12%	544,45	301,30	-243,15	-44,66%	0,25	0,22	-14,55%

Table 3.6 Variations of the indices that made up the Z-score model

Source: authors' calculations

Ferrari, Interpump group, Moncler and Tenaris had a Z-score higher than 2.99 despite the worsening of the Z-score mainly due to the strong contraction of market value and EBIT (negative in the case of Moncler and Tenaris), which in turn caused a contraction of ROA and the third-party independence ratio.

The study also found a medium probability of crisis for Buzzi Unicem and Amplifon even though these companies improved the z-score. This improvement can be attributed to a strategy used by many companies during this period, i.e. the non-distribution of dividends.

However, Buzzi Unicem's z-score should be attributed to this policy and the improved management of current assets and liabilities, which led to an increase in networking capital of +77.56%.

On the other hand, the analysis showed a worsening of Campari's z-score, which fell from 3.48 to 2.89, thus indicating a low probability of a crisis. The decline in the z-score is due to the drop in EBIT and consequently in ROA.

Finally, the analysis found that the remaining companies belonging to the industrial macro sector have a high probability of no longer being able to continue their business in the future. It should specify that these companies belong mainly to three Super Sectors: 'Oil and Natural Gas' 'Automobiles and Components' and 'Industrial Products and Services'. All these companies, except Prysmian, experienced a worsening of the z-score in all cases, mainly due to the drop in EBIT. This sometimes hurt the ROA of some companies belonging to the industrial products and services supersector, such as Atlantia and Cnh Industrial, which recorded a negative value of -0.85% and -0.19%, respectively. However, in these two cases, the z-score value of less than 1.81 was not only due to the profitability index but also to the low market value, which in turn hurt the third-party independence index, resulting in the case of Atlantia at 16.25% and for cnh industrial at 21.57%. Even more complicated is the situation of Leonardo, which, in addition to showing a low index of independence from third parties (15.83%), also led to a negative value of the flexibility index (-6.30%).

The companies belonging to the supersector Automobiles and Components also suffered a drop in EBIT, reaching negative values in the case of FCA and Pirelli. These caused a ROA of -0.94% and -0.43%, respectively and were justified by the contraction of receivables of 37% and 31.58%, respectively. Both companies experienced increased working capital, but FCA's situation is even more complicated as it has a low third-party independence ratio of 20.10% and a negative flexibility ratio (-3.43%).

The companies belonging to the oil and natural gas supersector also suffered a drastic drop in EBIT, causing Eni and Saipem a negative ROA of -3.28% and -6.28%, respectively. Also worsening the situation of these companies was the significant drop in market value -41.60% for Eni and -49.48% for Saipem, while their working capital management was good. It cannot be said the same for Snam, as it showed an improving but still negative flexibility index of -7.56%.

The analysis carried out using the Altman model, therefore, led to these considerations:

- The companies that experienced significant improvements were those belonging to the chemical-pharmaceutical and electronics sectors.

- Most affected by this pandemic were companies in the industrial products, automotive, construction and raw materials, gas and oil extraction sectors.

- A comparison of the Z-score values of 2019 with those of 2020 shows that the companies in a state of crisis in 2020 were already in a state of crisis in 2019, which means that they were not in an optimal condition even before the health emergency. Therefore, it can assume that the impact of the business freeze on the companies' financial statements depends not only on their ability to intervene and react quickly in the face of an exogenous event but also on the situation in which the companies were before the pandemic began.

As analysed in the preceding paragraph, the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) has defined several indicators for detecting corporate crises. Unlike Altman's model, the warning indices did not reveal any industrial company situations of severe economic-financial instability such as jeopardising going concern. However, this analysis made it possible to identify the balance sheet items on

Company	Equity		
	2019	2020	Δ%
Amplifon	603.330.000,00 €	670.178.000,00 €	11,08%
Atlantia	16.875.575.000,00 €	15.288.000.000,00 €	-9,41%
Buzzi Unicem	3.307.821.000,00 €	3.609.041.000,00 €	9,11%
Campari	2.223.500.000,00 €	2.196.800.000,00 €	-1,20%
Cnh Industrial	8.289.000.000,00 €	8.077.000.000,00 €	-2,56%
Diasorin	741.480.000,00 €	877.392.000,00 €	18,33%
Eni	51.510.000.000,00 €	39.524.000.000,00 €	-23,27%
Ferrari	1.393.147.000,00 €	1.345.317.000,00 €	-3,43%
FCA	27.820.000.000,00 €	25.755.000.000,00 €	-7,42%
Interpump Group	932.455.000,00 €	1.101.540.000,00 €	18,13%
Leonardo	5.067.000.000,00 €	5.498.000.000,00 €	8,51%
Moncler	1.004.280.000,00 €	1.273.133.000,00 €	26,77%
Pirelli & C.	4.758.799.000,00 €	4.504.908.000,00 €	-5,34%
Prysmian	2.447.000.000,00 €	2.511.000.000,00 €	2,62%
Recordati	1.079.269.000,00 €	1.244.345.000,00 €	15,30%
Saipem	4.075.000.000,00 €	3.214.000.000,00 €	-21,13%
Snam	6.140.000.000,00 €	6.300.000.000,00 €	2,61%
Stmicroelectronics	6.432.510.240,00 €	6.717.600.120,00 €	4,43%
Tenaris	10.973.815.837,92 €	10.422.228.394,50 €	-5,03%

Table 3.7 Equity of industrial company

Source: authors' calculations

which the pandemic had the most significant impact and the different strategies adopted by the company to cope with it. According to the CNDCEC, the first indicator to be checked to identify possible insolvency situations is negative equity. From what is shown in the table, the analysis revealed a positive net worth above the legal minimum (€50,000) for all companies.

The second indicator to be analysed according to the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) is the DSCR, the calculation of which, however, was not possible as adequate information was not available; instead, the alternative indices identified by the body were calculated.

Company	Sector	The sustainability index of financial charges %					The equity adequacy ratio %					The cash flow return ratio of assets %					Th liquidity cash flow %					The index of social security and tax liabilities %				
		2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level
Buzzi Unicem	C	3,47	6,14	2,68	77,15%	< 3,0	179,87	194,84	14,97	8,32%	> 7,6	2,44	3,31	0,87	35,57%	> 0,5	207,18	401,03	193,85	93,57%	> 93,7	1,09	2,23	1,15	105,64%	< 4,9
Campari	C	0,09	0,44	0,35	368,95%	< 3,0	105,57	95,31	-10,26	-9,72%	> 7,6	2,17	0,57	-1,60	-73,82%	> 0,5	258,06	142,50	-115,56	-44,78%	> 93,7	0,55	0,63	0,08	14,20%	< 4,9
CNH Industrial	C	0,96	1,17	0,21	21,58%	< 3,0	22,76	23,46	0,71	3,11%	> 7,6	-0,06	-1,55	-1,49	-2627,17%	> 0,5	300,80	339,52	38,73	12,87%	> 93,7	0,21	0,49	0,27	128,33%	< 4,9
Diasorin	C	0,69	0,64	-0,05	-7,40%	< 3,0	412,42	500,28	87,86	21,30%	> 7,6	9,39	9,30	-0,09	-0,95%	> 0,5	297,80	390,85	93,05	31,25%	> 93,7	1,59	3,67	2,08	130,48%	< 4,9
ENI	C	5,49	11,78	6,30	114,77%	< 3,0	92,01	71,42	-20,59	-22,38%	> 7,6	5,29	2,07	-3,23	-60,97%	> 0,5	130,45	124,55	-5,90	-4,53%	> 93,7	2,23	2,58	0,35	15,79%	< 4,9
Ferrari	C	1,72	2,64	0,92	53,56%	< 3,0	38,58	32,09	-6,49	-16,82%	> 7,6	12,71	3,35	-9,36	-73,63%	> 0,5	171,04	205,18	34,14	19,96%	> 93,7	0,78	0,37	-0,41	-52,79%	< 4,9
FCA	C	1,23	1,59	0,37	29,90%	< 3,0	58,67	56,19	-2,49	-4,24%	> 7,6	3,78	-6,44	-10,23	-270,33%	> 0,5	80,99	90,88	9,89	12,22%	> 93,7	1,11	1,33	0,23	20,41%	< 4,9
Interpump Group	C	1,02	1,86	0,84	82,93%	< 3,0	107,61	115,26	7,65	7,11%	> 7,6	4,38	6,37	1,99	45,50%	> 0,5	180,70	226,47	45,77	25,33%	> 93,7	2,31	1,03	-1,29	-55,58%	< 4,9
Leonardo	C	3,40	3,69	0,29	8,42%	< 3,0	26,75	29,96	3,20	11,98%	> 7,6	-3,54	-7,26	-3,72	-105,20%	> 0,5	93,28	89,35	-3,93	-4,22%	> 93,7	1,35	1,07	-0,28	-20,99%	< 4,9
Pirelli & C.	C	4,53	13,22	8,70	192,14%	< 3,0	65,60	53,06	-12,54	-19,11%	> 7,6	-1,97	-4,10	-2,13	-108,17%	> 0,5	107,28	144,89	37,60	35,05%	> 93,7	2,04	1,76	-0,28	-13,62%	< 4,9
Prysmian	C	3,57	5,80	2,22	62,24%	< 3,0	36,74	41,69	4,95	13,49%	> 7,6	-1,60	-0,87	0,73	45,73%	> 0,5	114,94	125,87	10,93	9,51%	> 93,7	2,20	2,85	0,65	29,32%	< 4,9
Recordati	C	1,47	1,18	-0,29	-19,96%	< 3,0	106,27	83,59	-22,68	-21,34%	> 7,6	6,04	7,80	1,76	29,16%	> 0,5	163,76	163,92	0,16	0,10%	> 93,7	3,09	1,87	-1,23	-39,59%	< 4,9
Stmicroelectronics	C	3,80	0,95	-2,85	-75,01%	< 3,0	171,50	164,72	-6,78	-3,95%	> 7,6	6,77	7,33	0,55	8,19%	> 0,5	274,61	188,73	-85,89	-31,28%	> 93,7	0,39	0,53	0,14	36,55%	< 4,9
Tenaris	C	0,48	0,53	0,05	9,54%	< 3,0	509,93	570,44	60,51	11,87%	> 7,6	5,94	6,93	1,00	16,76%	> 0,5	293,95	329,78	35,83	12,19%	> 93,7	0,81	0,70	-0,11	-13,28%	< 4,9
Saipem	F 41	3,41	5,93	2,52	74,07%	< 3,8	52,72	42,28	-10,43	-19,79%	> 4,9	3,40	-1,20	-4,60	-135,36%	> 0,4	134,95	120,78	-14,17	-10,50%	> 108	1,71	2,61	0,90	52,31%	< 3,8
Amplifon	G 47	1,58	2,32	0,74	46,87%	< 1,5	30,19	30,43	0,24	0,79%	> 4,2	3,56	3,05	-0,51	-14,36%	> 1	69,44	121,15	51,71	74,46%	> 89,8	0,71	2,00	1,29	182,36%	< 7,8
Snam	H	6,75	5,71	-1,04	-15,38%	< 1,5	38,33	35,75	-2,58	-6,72%	> 4,1	5,31	3,04	-2,27	-42,78%	> 1,4	60,78	71,19	10,41	17,12%	> 86	0,40	0,28	-0,12	-30,04%	< 10,2
Atlantia	M	20,20	34,22	14,02	69,41%	< 1,8	31,88	26,82	-5,06	-15,89%	> 5,2	2,89	1,12	-1,77	-61,24%	> 1,7	92,72	118,19	25,47	27,47%	> 95,4	0,42	0,21	-0,20	-48,56%	< 11,9
Moncler	N	1,94	2,86	0,92	47,13%	< 1,8	97,82	117,39	19,57	20,01%	> 5,2	8,14	1,55	-6,59	-80,91%	> 1,7	178,17	192,82	14,65	8,22%	> 95,4	4,76	4,82	0,05	1,14%	< 11,9

Table 3.8 Alert indexes of industrial companies

Source: authors' calculations

Table No. 3.8 shows the alert indices calculated on the data for the first half of 2019 and 2020, indicating the thresholds set by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) concerning the sector they belong to. Industrial companies were grouped into these five sectors: Manufacturing (C), Construction of buildings (F41), Retail trade (G47), Transport and storage (H) Business services (M,N).

Company	Sector	The equity adequacy ratio %					Equity			Total Debts		
		2019	2020	Diff.	Δ%	Level	2019	2020	Δ%	2019	2020	Δ%
Buzzi Unicem	C	179,87	194,84	14,97	8,32%	> 7,6	3.307.821.000,00 €	3.609.041.000,00 €	9,11%	1.839.018.000,00 €	1.852.299.000,00 €	0,72%
Campari	C	105,57	95,31	-10,26	-9,72%	> 7,6	2.223.500.000,00 €	2.196.800.000,00 €	-1,20%	2.106.200.000,00 €	2.305.000.000,00 €	9,44%
CNH Industrial	C	22,76	23,46	0,71	3,11%	> 7,6	8.289.000.000,00 €	8.077.000.000,00 €	-2,56%	36.427.000.000,00 €	34.424.000.000,00 €	-5,50%
Diasorin	C	412,42	500,28	87,86	21,30%	> 7,6	741.480.000,00 €	877.392.000,00 €	18,33%	179.786.000,00 €	175.379.000,00 €	-2,45%
ENI	C	92,01	71,42	-20,59	-22,38%	> 7,6	51.510.000.000,00 €	39.524.000.000,00 €	-23,27%	55.981.000.000,00 €	55.338.000.000,00 €	-1,15%
Ferrari	C	38,58	32,09	-6,49	-16,82%	> 7,6	1.393.147.000,00 €	1.345.317.000,00 €	-3,43%	3.611.464.000,00 €	4.192.598.000,00 €	16,09%
FCA	C	58,67	56,19	-2,49	-4,24%	> 7,6	27.820.000.000,00 €	25.755.000.000,00 €	-7,42%	47.415.000.000,00 €	45.837.000.000,00 €	-3,33%
Interpump Group	C	107,61	115,26	7,65	7,11%	> 7,6	932.455.000,00 €	1.101.540.000,00 €	18,13%	866.529.000,00 €	955.731.000,00 €	10,29%
Leonardo	C	26,75	29,96	3,20	11,98%	> 7,6	5.067.000.000,00 €	5.498.000.000,00 €	8,51%	18.940.000.000,00 €	18.353.000.000,00 €	-3,10%
Pirelli & C.	C	65,60	53,06	-12,54	-19,11%	> 7,6	4.758.799.000,00 €	4.504.908.000,00 €	-5,34%	7.253.846.000,00 €	8.489.430.000,00 €	17,03%
Prysmian	C	36,74	41,69	4,95	13,49%	> 7,6	2.447.000.000,00 €	2.511.000.000,00 €	2,62%	6.661.000.000,00 €	6.023.000.000,00 €	-9,58%
Recordati	C	106,27	83,59	-22,68	-21,34%	> 7,6	1.079.269.000,00 €	1.244.345.000,00 €	15,30%	1.015.600.000,00 €	1.488.624.000,00 €	46,58%
Stmicroelectronics	C	171,50	164,72	-6,78	-3,95%	> 7,6	6.432.510.240,00 €	6.717.600.120,00 €	4,43%	3.750.757.920,00 €	4.078.097.820,00 €	8,73%
Tenaris	C	509,93	570,44	60,51	11,87%	> 7,6	10.973.815.837,92 €	10.422.228.394,50 €	-5,03%	2.152.023.531,84 €	1.827.050.138,76 €	-15,10%
Saipem	F 41	52,72	42,28	-10,43	-19,79%	> 4,9	4.075.000.000,00 €	3.214.000.000,00 €	-21,13%	7.730.000.000,00 €	7.601.000.000,00 €	-1,67%
Amplifon	G 47	30,19	30,43	0,24	0,79%	> 4,2	603.330.000,00 €	670.178.000,00 €	11,08%	1.998.272.000,00 €	2.202.192.000,00 €	10,20%
Snam	H	38,33	35,75	-2,58	-6,72%	> 4,1	6.140.000.000,00 €	6.300.000.000,00 €	2,61%	16.020.000.000,00 €	17.622.000.000,00 €	10,00%
Atlantia	M	31,88	26,82	-5,06	-15,89%	> 5,2	16.875.575.000,00 €	15.288.000.000,00 €	-9,41%	52.932.573.000,00 €	57.010.000.000,00 €	7,70%
Moncler	N	97,82	117,39	19,57	20,01%	> 5,2	1.004.280.000,00 €	1.273.133.000,00 €	26,77%	1.026.659.000,00 €	1.084.511.000,00 €	5,63%

Table 3.9 The equity adequacy ratio of industrial companies

Source: authors' calculations

Since these are parent companies with a vital equity component, they largely respected the capital adequacy ratio. The analysis also found that most companies experienced a reduction in this ratio due in almost all cases to a reduction in equity and an increase in debt. The only companies to sustain the rise in the capital adequacy ratio were Diasorin (+21.30%) and Moncler (+20%). However, it was Diasorin that saw an improvement, as it was able to increase its means while at the same time reducing third-party standards and thus making the structure more solid. This was not the case for Moncler, where the increase in shareholders' equity justified the increase is more than proportionate to debt.

The tax and social security debt ratio analysis showed that all companies meet this requirement thanks to the low incidence of these debts on total assets. Specifically, Eni, Prysmian and Saipem showed an increase due to increased tax and social security debts and the simultaneous decrease in assets. Diasorin, on the other hand, recorded a reduction in this ratio due to the significant increase in assets +14.79%.

More critical for some manufacturing companies and all companies belonging to the other sectors was the analysis of the sustainability of financial expenses. These companies showed values above the maximum threshold, the most worrying worsening of which were: Campari (+368.95%), Pirelli (+192.14%) and Eni (114.77%). The reasons for the deterioration of this indicator are attributed to the significant increase in financial expenses, averaging 151%, and the decrease in sales, averaging 28%. Reporting a below-ceiling and improving indicator were: Diasorin (0.64%), which had an increase in sales (+9%) greater than that of financial charges (+1%), and Recordati (1.18%), which instead had a significant reduction in financial costs due to the repayment of loans.

Company	Sector	The index of social security and tax liabilities%					Social security and tax liabilities			Total assets		
		2019	2020	Diff.	Δ%	Level	2019	2020	Δ%	2019	2020	Δ%
Buzzi Unicem	C	1,09	2,23	1,15	105,64%	< 4,9	66.106.000,00 €	144.850.000,00 €	119,12%	6.085.650.000,00 €	6.484.589.000,00 €	6,56%
Campari	C	0,55	0,63	0,08	14,20%	< 4,9	26.900.000,00 €	31.500.000,00 €	17,10%	4.866.600.000,00 €	4.990.000.000,00 €	2,54%
CNH Industrial	C	0,21	0,49	0,27	128,33%	< 4,9	105.000.000,00 €	227.000.000,00 €	116,19%	49.418.000.000,00 €	46.790.000.000,00 €	-5,32%
Diasorin	C	1,59	3,67	2,08	130,48%	< 4,9	15.726.000,00 €	41.606.000,00 €	164,57%	987.654.000,00 €	1.133.746.000,00 €	14,79%
ENI	C	2,23	2,58	0,35	15,79%	< 4,9	2.787.000.000,00 €	2.974.000.000,00 €	6,71%	124.883.000.000,00 €	115.085.000.000,00 €	-7,85%
Ferrari	C	0,78	0,37	-0,41	-52,79%	< 4,9	41.206.000,00 €	21.593.000,00 €	-47,60%	5.277.970.000,00 €	5.859.004.000,00 €	11,01%
FCA	C	1,11	1,33	0,23	20,41%	< 4,9	1.097.000.000,00 €	1.247.000.000,00 €	13,67%	99.152.000.000,00 €	93.608.000.000,00 €	-5,59%
Interpump Group	C	2,31	1,03	-1,29	-55,58%	< 4,9	43.031.000,00 €	21.912.000,00 €	-49,08%	1.860.680.000,00 €	2.132.957.000,00 €	14,63%
Leonardo	C	1,35	1,07	-0,28	-20,99%	< 4,9	357.000.000,00 €	277.000.000,00 €	-22,41%	26.356.000.000,00 €	25.881.000.000,00 €	-1,80%
Pirelli & C.	C	2,04	1,76	-0,28	-13,62%	< 4,9	272.607.000,00 €	234.422.000,00 €	-14,01%	13.376.152.000,00 €	13.316.492.000,00 €	-0,45%
Prysmian	C	2,20	2,85	0,65	29,32%	< 4,9	232.000.000,00 €	283.000.000,00 €	21,98%	10.527.000.000,00 €	9.930.000.000,00 €	-5,67%
Recordati	C	3,09	1,87	-1,23	-39,59%	< 4,9	67.127.000,00 €	52.522.000,00 €	-21,76%	2.169.218.000,00 €	2.809.769.000,00 €	29,53%
Stmicroelectronics	C	0,39	0,53	0,14	36,55%	< 4,9	42.232.320,00 €	61.425.180,00 €	45,45%	10.939.050.720,00 €	11.652.089.580,00 €	6,52%
Tenaris	C	0,81	0,70	-0,11	-13,28%	< 4,9	106.549.503,84 €	86.700.306,24 €	-18,63%	13.183.036.008,48 €	12.370.568.337,60 €	-6,16%
Saipem	F 41	1,71	2,61	0,90	52,31%	< 3,8	211.000.000,00 €	295.000.000,00 €	39,81%	12.321.000.000,00 €	11.310.000.000,00 €	-8,21%
Amplifon	G 47	0,71	2,00	1,29	182,36%	< 7,8	19.811.325,00 €	61.432.000,00 €	210,09%	2.800.673.000,00 €	3.075.625.000,00 €	9,82%
Snam	H	0,40	0,28	-0,12	-30,04%	< 10,2	92.000.000,00 €	69.000.000,00 €	-25,00%	23.013.000.000,00 €	24.670.000.000,00 €	7,20%
Atlantia	M	0,42	0,21	-0,20	-48,56%	< 11,9	329.387.000,00 €	186.000.000,00 €	-43,53%	78.972.302.000,00 €	86.691.000.000,00 €	9,77%
Moncler	N	4,76	4,82	0,05	1,14%	< 11,9	100.723.000,00 €	118.343.000,00 €	17,49%	2.115.574.000,00 €	2.457.579.000,00 €	16,17%

Table 3.10 The index of social security and tax liabilities of industrial companies

Source: authors' calculations

Company	Sector	The sustainability of financial charges %					Financial Charges			Revenue		
		2019	2020	Diff.	Δ%	Level	2019	2020	Δ%	2019	2020	Δ%
Buzzi Unicem	C	3,47	6,14	2,68	77,15%	< 3,0	52.674.000,00 €	93.395.000,00 €	77,31%	1.518.723.000,00 €	1.520.095.000,00 €	0,09%
Campari	C	0,09	0,44	0,35	368,95%	< 3,0	800.000,00 €	3.400.000,00 €	325,00%	848.200.000,00 €	768.700.000,00 €	-9,37%
CNH Industrial	C	0,96	1,17	0,21	21,58%	< 3,0	135.000.000,00 €	129.000.000,00 €	-4,44%	14.011.000.000,00 €	11.012.000.000,00 €	-21,40%
Diasorin	C	0,69	0,64	-0,05	-7,40%	< 3,0	2.434.000,00 €	2.460.000,00 €	1,07%	350.257.000,00 €	382.287.000,00 €	9,14%
ENI	C	5,49	11,78	6,30	114,77%	< 3,0	2.029.000.000,00 €	2.596.000.000,00 €	27,94%	36.980.000.000,00 €	22.030.000.000,00 €	-40,43%
Ferrari	C	1,72	2,64	0,92	53,56%	< 3,0	33.046.000,00 €	39.650.000,00 €	19,98%	1.923.660.000,00 €	1.503.010.000,00 €	-21,87%
FCA	C	1,23	1,59	0,37	29,90%	< 3,0	628.000.000,00 €	514.000.000,00 €	-18,15%	51.222.000.000,00 €	32.274.000.000,00 €	-36,99%
Interpump Group	C	1,02	1,86	0,84	82,93%	< 3,0	7.162.000,00 €	11.915.000,00 €	66,36%	703.203.000,00 €	639.536.000,00 €	-9,05%
Leonardo	C	3,40	3,69	0,29	8,42%	< 3,0	203.000.000,00 €	217.000.000,00 €	6,90%	5.962.000.000,00 €	5.878.000.000,00 €	-1,41%
Pirelli & C.	C	4,53	13,22	8,70	192,14%	< 3,0	120.154.000,00 €	240.166.000,00 €	99,88%	2.654.847.000,00 €	1.816.429.000,00 €	-31,58%
Prysmian	C	3,57	5,80	2,22	62,24%	< 3,0	209.000.000,00 €	289.000.000,00 €	38,28%	5.849.000.000,00 €	4.985.000.000,00 €	-14,77%
Recordati	C	1,47	1,18	-0,29	-19,96%	< 3,0	10.922.000,00 €	8.941.000,00 €	-18,14%	743.253.000,00 €	760.192.000,00 €	2,28%
Stmicroelectronics	C	3,80	0,95	-2,85	-75,01%	< 3,0	141.654.240,00 €	36.499.020,00 €	-74,23%	3.723.482.880,00 €	3.838.628.640,00 €	3,09%
Tenaris	C	0,48	0,53	0,05	9,54%	< 3,0	16.073.796,96 €	14.118.889,20 €	-12,16%	3.334.350.764,16 €	2.673.647.578,32 €	-19,82%
Saipem	F 41	3,41	5,93	2,52	74,07%	< 3,8	154.000.000,00 €	218.000.000,00 €	41,56%	4.519.000.000,00 €	3.675.000.000,00 €	-18,68%
Amplifon	G 47	1,58	2,32	0,74	46,87%	< 1,5	13.121.000,00 €	14.219.000,00 €	8,37%	832.035.000,00 €	613.899.000,00 €	-26,22%
Snam	H	6,75	5,71	-1,04	-15,38%	< 1,5	89.000.000,00 €	76.000.000,00 €	-14,61%	1.318.000.000,00 €	1.330.000.000,00 €	0,91%
Atlantia	M	20,20	34,22	14,02	69,41%	< 1,8	1.132.073.000,00 €	1.271.000.000,00 €	12,27%	5.604.000.000,00 €	3.714.000.000,00 €	-33,73%
Moncler	N	1,94	2,86	0,92	47,13%	< 1,8	11.072.000,00 €	11.522.000,00 €	4,06%	570.246.000,00 €	403.334.000,00 €	-29,27%

Table 3.11 The sustainability of financial charges of industrial companies

Source: authors' calculations

The study also showed inadequate and worsening values for all industrial companies' liquid asset return index except for Buzzi Unicem, Interpump Group, Recordati, STMicroelectronics, Tenaris, and Prysmian. The latter, moreover, despite showing an improvement. (-0.87%) did not meet the ceiling due to negative operating cash flow. FCA, Saipem, Cnh Industrial and Pirelli are also in this situation. But the situation of the last three companies is of greater concern, as they had already experienced negative cash flow in 2019. It is argued that the going concern of these companies could over time be called into question by the continued prevalence of operating cash resources absorbed by those generated, and this could happen especially to companies that do not generate much cash resources from non-core business activities.

Company	Sector	The cash flow return ratio of assets %					Cash Flow			Total Assets		
		2019	2020	Diff.	Δ%	Level	2019	2020	Δ%	2019	2020	Δ%
Buzzi Unicem	C	2,44	3,31	0,87	35,57%	> 0,5	148.435.000,00 €	214.430.000,00 €	44,46%	6.085.650.000,00 €	6.484.589.000,00 €	6,56%
Campari	C	2,17	0,57	-1,60	-73,82%	> 0,5	105.800.000,00 €	28.400.000,00 €	-73,16%	4.866.600.000,00 €	4.990.000.000,00 €	2,54%
CNH Industrial	C	-0,06	-1,55	-1,49	-2627,17%	> 0,5	-28.000.000,00 €	-723.000.000,00 €	-2482,14%	49.418.000.000,00 €	46.790.000.000,00 €	-5,32%
Diasorin	C	9,39	9,30	-0,09	-0,95%	> 0,5	92.721.000,00 €	105.421.000,00 €	13,70%	987.654.000,00 €	1.133.746.000,00 €	14,79%
ENI	C	5,29	2,07	-3,23	-60,97%	> 0,5	6.612.000.000,00 €	2.378.000.000,00 €	-64,04%	124.883.000.000,00 €	115.085.000.000,00 €	-7,85%
Ferrari	C	12,71	3,35	-9,36	-73,63%	> 0,5	670.725.000,00 €	196.351.000,00 €	-70,73%	5.277.970.000,00 €	5.859.004.000,00 €	11,01%
FCA	C	3,78	-6,44	-10,23	-270,33%	> 0,5	3.751.000.000,00 €	-6.032.000.000,00 €	-260,81%	99.152.000.000,00 €	93.608.000.000,00 €	-5,59%
Interpump Group	C	4,38	6,37	1,99	45,50%	> 0,5	81.424.000,00 €	135.805.000,00 €	66,79%	1.860.680.000,00 €	2.132.957.000,00 €	14,63%
Leonardo	C	-3,54	-7,26	-3,72	-105,20%	> 0,5	-932.000.000,00 €	-1.878.000.000,00 €	-101,50%	26.356.000.000,00 €	25.881.000.000,00 €	-1,80%
Pirelli & C.	C	-1,97	-4,10	-2,13	-108,17%	> 0,5	-263.361.000,00 €	-545.786.000,00 €	-107,24%	13.376.152.000,00 €	13.316.492.000,00 €	-0,45%
Prysmian	C	-1,60	-0,87	0,73	45,73%	> 0,5	-168.000.000,00 €	-86.000.000,00 €	48,81%	10.527.000.000,00 €	9.930.000.000,00 €	-5,67%
Recordati	C	6,04	7,80	1,76	29,16%	> 0,5	130.977.000,00 €	219.130.000,00 €	67,30%	2.169.218.000,00 €	2.809.769.000,00 €	29,53%
Stmicroelectronics	C	6,77	7,33	0,55	8,19%	> 0,5	740.825.280,00 €	853.720.980,00 €	15,24%	10.939.050.720,00 €	11.652.089.580,00 €	6,52%
Tenaris	C	5,94	6,93	1,00	16,76%	> 0,5	782.984.573,28 €	857.866.734,54 €	9,56%	13.183.036.008,48 €	12.370.568.337,60 €	-6,16%
Saipem	F 41	3,40	-1,20	-4,60	-135,36%	> 0,4	419.000.000,00 €	-136.000.000,00 €	-132,46%	12.321.000.000,00 €	11.310.000.000,00 €	-8,21%
Amplifon	G 47	3,56	3,05	-0,51	-14,36%	> 1	99.818.000,00 €	93.879.000,00 €	-5,95%	2.800.673.000,00 €	3.075.625.000,00 €	9,82%
Snam	H	5,31	3,04	-2,27	-42,78%	> 1,4	1.221.000.000,00 €	749.000.000,00 €	-38,66%	23.013.000.000,00 €	24.670.000.000,00 €	7,20%
Atlantia	M	2,89	1,12	-1,77	-61,24%	> 1,7	2.282.000.000,00 €	971.000.000,00 €	-57,45%	78.972.302.000,00 €	86.691.000.000,00 €	9,77%
Moncler	N	8,14	1,55	-6,59	-80,91%	> 1,7	172.282.000,00 €	38.205.000,00 €	-77,82%	2.115.574.000,00 €	2.457.579.000,00 €	16,17%

Table 3.12 The cash flow return ratio of assets of industrial companies

Source: authors' calculations

On the other hand, all companies' liquidity index was positive, except Campari, STMicroelectronics and Saipem, which nevertheless maintained a value above the minimum for each sector. However, the improvement in this indicator can be attributed to the increase in current assets due to the financing offered by banks to enable a faster economic recovery.

The business freeze and the lockdown resulted in an average decrease in turnover of industrial companies of about 19% and, due to an inadequate decrease in operating costs, a decrease in EBIT of 51%. Significant was the decrease in ROA which, despite the increase in total assets (+7%) due to EBIT reduction, fell from 3.20% in 2019 to a discount of 1.03% in 2020.

As a result of the financing obtained by companies to comply with health regulations and to make new strategic investments, companies experienced an average 8% increase in financial expenses. This caused profits to fall by 77%, and, consequently, the return on equity ratio decreased from 7.57% to 1.58%. Despite this, companies improved the management of current assets (+7%) and current liabilities (-8%), resulting in improved working capital by 36%. However, the improvement in working capital combined with the profit contraction caused an

Company	Sector	The liquidity ratio %					Short term assets			Short term debts		
		2019	2020	Diff.	Δ%	Level	2019	2020	Δ%	2019	2020	Δ%
Buzzi Unicem	C	207,18	401,03	193,85	93,57%	> 93,7	1.669.491.000,00 €	2.041.783.000,00 €	22,30%	805.826.000,00 €	509.139.000,00 €	-36,82%
Campari	C	258,06	142,50	-115,56	-44,78%	> 93,7	1.748.900.000,00 €	1.842.000.000,00 €	5,32%	677.700.000,00 €	1.292.600.000,00 €	90,73%
CNH Industrial	C	300,80	339,52	38,73	12,87%	> 93,7	34.682.000.000,00 €	32.136.000.000,00 €	-7,34%	11.530.000.000,00 €	9.465.000.000,00 €	-17,91%
Diasorin	C	297,80	390,85	93,05	31,25%	> 93,7	461.370.000,00 €	595.846.000,00 €	29,15%	154.925.000,00 €	152.448.000,00 €	-1,60%
ENI	C	130,45	124,55	-5,90	-4,53%	> 93,7	39.884.000.000,00 €	31.890.000.000,00 €	-20,04%	30.573.000.000,00 €	25.604.000.000,00 €	-16,25%
Ferrari	C	171,04	205,18	34,14	19,96%	> 93,7	2.673.802.000,00 €	2.945.448.000,00 €	10,16%	1.563.272.000,00 €	1.435.531.000,00 €	-8,17%
FCA	C	80,99	90,88	9,89	12,22%	> 93,7	37.691.000.000,00 €	31.976.000.000,00 €	-15,16%	46.540.000.000,00 €	35.185.000.000,00 €	-24,40%
Interpump Group	C	180,70	226,47	45,77	25,33%	> 93,7	887.146.000,00 €	1.020.131.000,00 €	14,99%	490.956.000,00 €	450.453.000,00 €	-8,25%
Leonardo	C	93,28	89,35	-3,93	-4,22%	> 93,7	14.065.000.000,00 €	13.681.000.000,00 €	-2,73%	15.078.000.000,00 €	15.312.000.000,00 €	1,55%
Pirelli & C.	C	107,28	144,89	37,60	35,05%	> 93,7	3.397.061.000,00 €	3.646.215.000,00 €	7,33%	3.166.418.000,00 €	2.516.610.000,00 €	-20,52%
Prysmian	C	114,94	125,87	10,93	9,51%	> 93,7	5.054.000.000,00 €	4.549.000.000,00 €	-9,99%	4.397.000.000,00 €	3.614.000.000,00 €	-17,81%
Recordati	C	163,76	163,92	0,16	0,10%	> 93,7	657.404.000,00 €	840.272.000,00 €	27,82%	401.450.000,00 €	512.610.000,00 €	27,69%
Stmicroelectronics	C	274,61	188,73	-85,89	-31,28%	> 93,7	5.281.679.520,00 €	5.587.910.940,00 €	5,80%	1.923.330.240,00 €	2.960.871.720,00 €	53,95%
Tenaris	C	293,95	329,78	35,83	12,19%	> 93,7	5.061.191.616,00 €	4.022.988.750,90 €	-20,51%	1.721.794.089,60 €	1.219.895.172,60 €	-29,15%
Saipem	F 41	134,95	120,78	-14,17	-10,50%	> 108	6.348.000.000,00 €	6.167.000.000,00 €	-2,85%	4.704.000.000,00 €	5.106.000.000,00 €	8,55%
Amplifon	G 47	69,44	121,15	51,71	74,46%	> 89,8	470.883.000,00 €	706.664.000,00 €	50,07%	678.108.000,00 €	583.309.000,00 €	-13,98%
Snam	H	60,78	71,19	10,41	17,12%	> 86	3.630.000.000,00 €	4.609.000.000,00 €	26,97%	5.972.000.000,00 €	6.474.000.000,00 €	8,41%
Atlantia	M	92,72	118,19	25,47	27,47%	> 95,4	10.862.109.000,00 €	13.178.000.000,00 €	21,32%	11.714.906.000,00 €	11.150.000.000,00 €	-4,82%
Moncler	N	178,17	192,82	14,65	8,22%	> 95,4	848.340.000,00 €	1.049.964.000,00 €	23,77%	476.133.000,00 €	544.527.000,00 €	14,36%

Table 3.13 The current ratio of industrial companies

Source: authors' calculations

average 57% deterioration in cash flow, thus losing their ability to recover investments through operations. Another key finding of the study is the 11% increase in retained earnings. In fact, in the face of a health emergency, many companies decided not to distribute profits but to keep them in the company and invest them in the business.

Results Non-financial services macro-sector

The non-financial services macro sector comprises companies from the worlds of telecommunications, power and utilities. These companies were negatively impacted even though they played a critical economic role during the lockdown by ensuring communication and enabling the implementation of distance learning and smart working.

Despite the surge in domestic consumption, the power and gas sectors have suffered dramatically from the lockdown, especially in the North as an area of high industrial concentration. The increase in domestic consumption was not significant enough to cover the drop in industrial consumption.

Companies belonging to the utility sector coped with the consequences of the pandemic by modifying their business models, adopting new strategies aimed at guaranteeing the safety of employees, continuity in service delivery, and introducing new risk management systems by investing more resources in research and development. Equally crucial for households and businesses were infrastructures, internet and telecommunication services. The closure of non-essential activities has led: companies to adopt smart working, the closure of shops has encouraged families to buy even essential goods through e-commerce, and the closure of schools has forced families to adopt an internet network and buy a PC to enable their children to attend classes. Telecommunication companies then enabled the government to update citizens on the economic and health situation. These companies made significant investments in fibre-optic research and development, identifying new cable protection products and investing in existing infrastructure by rapidly changing technology.

The analysis of the enterprises belonging to the non-financial services macro-sector was carried out using only the alert indices. As in the case of industrial companies, the research started by analysing the net worth requirement. The table below showed that it was primarily met, with all companies having a positive net worth and above the legal minimum.

Company	Equity		
	2019	2020	Δ %
A2A	175.000.000,00 €	163.000.000,00 €	-6,86%
Enel	2.893.000.000,00 €	2.403.000.000,00 €	-16,94%
Italgas	166.160.000,00 €	162.796.000,00 €	-2,02%
Terna	368.400.000,00 €	379.600.000,00 €	3,04%
Hera	173.900.000,00 €	174.900.000,00 €	0,58%
Telecom Italia	740.000.000,00 €	723.000.000,00 €	-2,30%

The study showed a decrease in shareholders' equity only for Enel, which had a decline in both profits and related reserves. Telecom Italia had an increase in funds less than proportional to the other balance sheet items. On the other hand, the other companies experienced an increase in shareholders' equity due to an increase in retained earnings and related reserves.

Alternative ratios to the DSCR were then analysed by dividing the non-financial services companies into three sectors: Energy and Gas Transmission (D), Water Supply, Sewerage and Waste (J) and Business Services (E).

Table 3.14 Equity of no-financial service company

Source: authors' calculations

Company	Sector	The sustainability index of financial charges %					The equity adequacy ratio %					The cash flow return ratio of assets %					The liquidity ratio %					The index of social security and tax liabilities %				
		2019	2020	Diff.	Δ %	Level	2019	2020	Diff.	Δ %	Level	2019	2020	Diff.	Δ %	Level	2019	2020	Diff.	Δ %	Level	2019	2020	Diff.	Δ %	Level
A2A	D	1,94	1,46	-0,48	-24,75%	< 2,6	58,50	59,73	1,23	2,10%	> 6,7	5,05	3,29	-1,75	-34,77%	> 1,9	101,74	102,28	0,54	0,53%	> 84,2	5,33	1,50	-3,84	-71,96%	< 6,5
Enel	D	7,38	9,27	1,89	25,62%	< 2,6	49,90	41,97	-7,92	-15,88%	> 6,7	2,71	1,22	-1,49	-54,86%	> 1,9	89,19	85,09	-4,10	-4,60%	> 84,2	1,99	1,72	-0,27	-13,59%	< 6,5
Italgas	D	2,93	2,82	-0,11	-3,65%	< 2,6	26,47	28,16	1,69	6,40%	> 6,7	7,81	4,83	-2,98	-38,18%	> 1,9	55,01	98,59	43,58	79,22%	> 84,2	1,52	0,35	-1,17	-77,06%	< 6,5
Terna	D	4,09	4,22	0,12	3,00%	< 2,6	35,23	35,06	-0,17	-0,49%	> 6,7	2,15	1,03	-1,13	-52,24%	> 1,9	90,52	71,21	-19,31	-21,34%	> 84,2	1,23	0,44	-0,78	-63,92%	< 6,5
Hera	E	3,54	2,67	-0,87	-24,51%	< 2,6	49,80	46,46	-3,34	-6,70%	> 6,7	4,14	4,69	0,55	13,31%	> 1,9	104,48	103,73	-0,75	-0,72%	> 84,2	2,68	3,15	0,46	17,22%	< 6,5
Telecom Italia	J	14,83	14,23	-0,60	-4,07%	< 1,8	52,17	49,93	-2,24	-4,29%	> 5,2	4,54	6,05	1,51	33,31%	> 1,7	80,80	91,24	10,44	12,92%	> 95,4	1,10	1,65	0,55	50,02%	< 11,9

Table 3.15 Alert indices of no-financial service companies

Source: authors' calculations

As shown in Table 3.14, the analysis did not reveal any problems related to the capital adequacy ratio and social security and tax debt. The first requirement is respected thanks to the high capital component of the parent companies, even though it showed a decrease for all companies except Italgas (+6.40%) and A2A (+2.10%). There were significant decreases for Hera, which went from 49.80% to 46.46%, and Enel, 49.9% to 41.97%.

Company	Sector	The equity adequacy ratio %					Equity			Total debts		
		2019	2020	Diff.	Δ %	Level	2019	2020	Δ %	2019	2020	Δ %
A2A	D	58,50	59,73	1,23	2,10%	> 6,7	3.523.000.000,00 €	3.650.000.000,00 €	3,60%	6.022.000.000,00 €	6.111.000.000,00 €	1,48%
Enel	D	49,90	41,97	-7,92	-15,88%	> 6,7	51.651.000.000,00 €	44.754.000.000,00 €	-13,35%	103.511.000.000,00 €	106.622.000.000,00 €	3,01%
Italgas	D	26,47	28,16	1,69	6,40%	> 6,7	1.323.153.000,00 €	1.757.392.000,00 €	32,82%	4.999.420.000,00 €	6.240.805.000,00 €	24,83%
Terna	D	35,23	35,06	-0,17	-0,49%	> 6,7	4.744.100.000,00 €	4.953.000.000,00 €	4,40%	13.464.800.000,00 €	14.126.400.000,00 €	4,91%
Hera	E	49,80	46,46	-3,34	-6,70%	> 6,7	2.896.800.000,00 €	3.071.700.000,00 €	6,04%	5.816.800.000,00 €	6.611.000.000,00 €	13,65%
Telecom Italia	J	52,17	49,93	-2,24	-4,29%	>5,2	22.985.000.000,00 €	21.513.000.000,00 €	-6,40%	44.055.000.000,00 €	43.084.000.000,00 €	-2,20%

Table 3.16 The equity adequacy ratio of no- financial service companies

Source: authors' calculations

The social security and tax debt ratios of non-financial services companies also comply with the upper limits set by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC). The analysis of this indicator showed that all companies belonging to the gas and energy transmission sector sustained an improvement; in fact, this indicator decreased by an average of 57%. For the companies belonging to the other two sectors, on the other hand, an average increase in tax and social security debts of 37.5% led to a worsening of this indicator by 34%. However, the most significant figures were A2A's decrease of -3.84% and the deterioration of Hera (0.46%) and Telecom Italia (0.55%).

Company	Sector	The index of social security and tax liabilities %					Social security and tax liabilities			Total assets		
		2019	2020	Diff.	Δ %	Level	2019	2020	Δ %	2019	2020	Δ %
A2A	D	5,33	1,50	-3,84	-71,96%	< 6,5	557.000.000,00 €	159.000.000,00 €	-71,45%	10.442.000.000,00 €	10.632.000.000,00 €	1,82%
Enel	D	1,99	1,72	-0,27	-13,59%	< 6,5	3.389.000.000,00 €	2.868.000.000,00 €	-15,37%	170.508.000.000,00 €	166.995.000.000,00 €	-2,06%
Italgas	D	1,52	0,35	-1,17	-77,06%	< 6,5	101.519.000,00 €	29.121.000,00 €	-71,31%	6.659.998.000,00 €	8.326.452.000,00 €	25,02%
Terna	D	1,23	0,44	-0,78	-63,92%	< 6,5	217.500.000,00 €	82.200.000,00 €	-62,21%	17.751.100.000,00 €	18.594.400.000,00 €	4,75%
Hera	E	2,68	3,15	0,46	17,22%	< 6,5	249.600.000,00 €	327.100.000,00 €	31,05%	9.297.100.000,00 €	10.394.100.000,00 €	11,80%
Telecom Italia	J	1,10	1,65	0,55	50,02%	<11,9	760.000.000,00 €	1.098.000.000,00 €	44,47%	69.112.000.000,00 €	66.557.000.000,00 €	-3,70%

Table 3.17 The index of social security and tax liabilities of no-financial service companies

Source: authors' calculations

As in the case of industrial companies, the analysis of the sustainability index of financial expenses showed a vital criticality, detecting for all companies except A2A a value above the maximum limit set by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC). Substantial reductions in financial costs were achieved by A2A (-35.71%) Hera (23.83%), and Telecom Italia (17.24%). However, the significant decrease in financial expenses resulting from the repayment of loans and other financial debts improved this indicator for most companies with an average reduction of 19%. This shows an opposite phenomenon observed previously for companies belonging to the industrial macro sector.

Company	Sector	The sustainability index of financial charges %					Financial charges			Revenue		
		2019	2020	Diff.	Δ %	Level	2019	2020	Δ %	2019	2020	Δ %
A2A	D	1,94	1,46	-0,48	-24,75%	< 2,6	70.000.000,00 €	45.000.000,00 €	-35,71%	3.610.000.000,00 €	3.084.000.000,00 €	-14,57%
Enel	D	7,38	9,27	1,89	25,62%	< 2,6	2.768.000.000,00 €	3.014.000.000,00 €	8,89%	37.516.000.000,00 €	32.520.000.000,00 €	-13,32%
Italgas	D	2,93	2,82	-0,11	-3,65%	< 2,6	24.477.000,00 €	26.753.000,00 €	9,30%	835.972.000,00 €	948.278.000,00 €	13,43%
Terna	D	4,09	4,22	0,12	3,00%	< 2,6	45.400.000,00 €	49.000.000,00 €	7,93%	1.109.000.000,00 €	1.162.100.000,00 €	4,79%
Hera	E	3,54	2,67	-0,87	-24,51%	< 2,6	119.200.000,00 €	90.800.000,00 €	-23,83%	3.371.600.000,00 €	3.402.300.000,00 €	0,91%
Telecom Italia	J	14,83	14,23	-0,60	-4,07%	<1,8	1.334.000.000,00 €	1.104.000.000,00 €	-17,24%	8.994.000.000,00 €	7.759.000.000,00 €	-13,73%

Table 3.18 The sustainability index of financial charges of no-financial service companies

Source: authors' calculations

The quick ratio met the limits for all non-financial services companies. On the other hand, the analysis showed a decrease in the return on assets ratio mainly due to the sharp drop in cash flow, which was particularly significant in the case of Enel (-55.79%), Terna (-49.97%), A2A (-33.59%) and Italgas (-22.71%). The decrease in these cash flows was: a reduction in profit for the year and inadequate management of net working capital. However, among the above companies, the most worrying is Enel's (1.22%) and Terna's (1.03%) indicators, as they do not exceed the minimum requirement of 1.9%.

The operating cash flow of the companies belonging to the water supply, sewerage and waste disposal, and telecommunications sectors showed an average increase of 27.5%, thus causing an improvement in the return on assets ratio and achieving values above the minimum threshold. Among these improvements was Hera, which went from 4.14% to 4.69% (minimum threshold 1.9%) and Telecom Italia, which went from 4.54% to 6.05% (minimum threshold 1.7%).

The results also showed that those who failed to meet the minimum liquidity ratio requirement were Terna, which recorded a falling ratio of 71.21% against the minimum threshold of 84.2%, and Telecom, which instead showed an improvement, rising from 80.80% to 91.24% but remaining below the 95.4% minimum threshold. Telecom's improvement and Terna's deterioration were due to progress and decline in current assets and liabilities management. Concerning the quick ratio analysis, of particular importance is the situation of Italgas, which, thanks to the significant increase in short-term assets (108%), recorded a rise in this indicator from 55.01% to 98.59%, thus exceeding the minimum threshold of 84.20%.

Company	Sector	The cash flow return ratio of assets %					Cash Flow			Total assets		
		2019	2020	Diff.	Δ %	Level	2019	2020	Δ %	2019	2020	Δ %
A2A	D	5,05	3,29	-1,75	-34,77%	> 1,9	527.000.000,00 €	350.000.000,00 €	-33,59%	10.442.000.000,00 €	10.632.000.000,00 €	1,82%
Enel	D	2,71	1,22	-1,49	-54,86%	> 1,9	4.619.000.000,00 €	2.042.000.000,00 €	-55,79%	170.508.000.000,00 €	166.995.000.000,00 €	-2,06%
Italgas	D	7,81	4,83	-2,98	-38,18%	> 1,9	520.438.000,00 €	402.221.000,00 €	-22,71%	6.659.998.000,00 €	8.326.452.000,00 €	25,02%
Terna	D	2,15	1,03	-1,13	-52,24%	> 1,9	382.400.000,00 €	191.300.000,00 €	-49,97%	17.751.100.000,00 €	18.594.400.000,00 €	4,75%
Hera	E	4,14	4,69	0,55	13,31%	> 1,9	384.500.000,00 €	487.100.000,00 €	26,68%	9.297.100.000,00 €	10.394.100.000,00 €	11,80%
Telecom Italia	J	4,54	6,05	1,51	33,31%	>1,7	3.139.000.000,00 €	4.030.000.000,00 €	28,38%	69.112.000.000,00 €	66.557.000.000,00 €	-3,70%

Table 3.19 The cash flow ratio of assets of no-financial service companies

Source: authors' calculations

Company	Sector	The liquidity ratio %					Short term assets			Short term debts		
		2019	2020	Diff.	Δ %	Level	2019	2020	Δ %	2019	2020	Δ %
A2A	D	101,74	102,28	0,54	0,53%	> 84,2	2.983.000.000,00 €	2.914.000.000,00 €	-2,31%	2.932.000.000,00 €	2.849.000.000,00 €	-2,83%
Enel	D	89,19	85,09	-4,10	-4,60%	> 84,2	35.705.000.000,00 €	35.267.000.000,00 €	-1,23%	40.031.000.000,00 €	41.447.000.000,00 €	3,54%
Italgas	D	55,01	98,59	43,58	79,22%	> 84,2	442.322.000,00 €	921.430.000,00 €	108,32%	804.065.000,00 €	934.601.000,00 €	16,23%
Terna	D	90,52	71,21	-19,31	-21,34%	> 84,2	3.457.700.000,00 €	3.392.700.000,00 €	-1,88%	3.819.700.000,00 €	4.764.400.000,00 €	24,73%
Hera	E	104,48	103,73	-0,75	-0,72%	> 84,2	3.005.400.000,00 €	3.175.100.000,00 €	5,65%	2.876.400.000,00 €	3.060.900.000,00 €	6,41%
Telecom Italia	J	80,80	91,24	10,44	12,92%	>95,4	8.253.000.000,00 €	9.611.000.000,00 €	16,45%	10.214.000.000,00 €	10.534.000.000,00 €	3,13%

Table 3.20 The current ratio of assets of no-financial service companies

Source: authors' calculations

Finally, it can argue that the freezing of activities did not directly impact the non-financial services companies as they continued their activities as usual except for construction. These companies suffered indirect effects such as the 6% reduction in turnover mainly due to the drop in consumption by industries justified by the suspension of activities ordered by government measures. In addition, the costs that the companies incurred to adapt their facilities to the new hygiene and health regulations and to purchase protective equipment impacted EBIT, causing an average drop of 5%. Unlike the industrial companies, none of the companies belonging to this sector recorded a negative Ebit. This resulted in an adjusted ROA of 2.78%, but lower than in 2019 (3.12%). As shown above, in contrast to the industries, financial expenses decreased by 5%. In addition, ROE decreased from 5.80% to 5.53% due to a decrease in profits of about 2%. Combined with a positive change in working capital (+8%), the latter led to a 28% drop in operating cash flow. It should also note that the non-financial services companies also adopted the strategy of non-distribution of profits, which increased by 9%.

Results and financial services macro-sector

The financial services macro-sector consists of banks, financial institutions and insurance companies. During the pandemic, these institutions played a vital role by providing liquidity to households and businesses. The freezing of assets and the consequent decrease in income put a strain on families, who were forced to reduce specific consumption, and on companies, which, faced with lower intROIts, found it very difficult to repay loans and obtain new capital. This led to a significant contraction of liquidity on the market despite the numerous interventions by the ECB and governments aimed at ensuring a finite level of liquidity and a rapid economic recovery. The government took several measures to help households: the freeze on redundancies, the extension of the redundancy fund to more sectors, the introduction of compensation for seasonal workers and the self-employed, and a series of other measures introduced by the 'Decreto Cura Italia' aimed at boosting disposable income, consumption, and consequently the productive activity of companies. Other measures envisaged by the government but with the collaboration of the banks and always in favour of households were: the suspension of mortgage payments for the year 2020 up to a maximum of 18 months and the introduction of the Solidarity Fund for first home mortgages aimed at covering 50% of the interest accrued during the mortgage suspension period.

These institutions have also provided a series of aids to businesses, tiny and medium-sized ones, examples of which are: the SME guarantee fund, the withdrawal of credit facilities, and the moratorium on mortgages.

Helping the economic recovery were also the interventions of the ECB, which planned a series of LTROs, i.e. a series of loans aimed at providing liquidity to banks but at cheaper interest rates.

The study of the institutions belonging to the macro-financial sector was conducted using capital, financial and income ratios diversified according to the type of activity carried out by the company: banking, insurance and financial intermediaries.

Banking Institutions

It analysed banks by assessing their capital adequacy, income and risk and liquidity levels.

The capital analysis was carried out considering the capital requirements established by the Basel Three Accord: the Tier 1 Capital Ratio and the Total Capital Ratio. For all institutions, the values identified for both indicators were higher than the minimum limits set by the agreement at 6% and 8%, respectively. This indicates that all institutions guarantee high reliability. However, the first indicator improved for all banks except Banca Generali, which, together with Bper Banca, also showed a deterioration in the Total Capital Ratio.

Banking Institution	Sector	Tier 1 Capital Ratio %					Total Capital Ratio %					Leverage Ratio %					Net Financial Debt %				Loan to Deposit Ratio				
		2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	Level
Banca Generali	K	15,68	15,66	-0,02	-0,14%	> 6 %	17,06	15,66	-1,39	-8,17%	> 8%	5,98	5,77	-0,21	-3,54%	> 3%	8,56	3,50	-5,05	-59,06%	0,67	0,76	0,09	12,81%	0,8-1,0
Banca Mediolanum	K	19,00	19,30	0,30	1,58%	> 6 %	19,00	19,30	0,30	1,58%	> 8%	3,54	3,33	-0,21	-5,94%	> 3%	0,57	1,82	1,25	218,52%	0,95	1,00	0,05	5,40%	0,8-1,0
Banco Bpm	K	14,41	15,96	1,55	10,76%	> 6 %	16,50	17,94	1,44	8,73%	> 8%	6,03	6,16	0,13	2,10%	> 3%	-14,23	-11,21	3,02	21,25%	1,10	1,10	0,00	-0,08%	0,8-1,0
Bper Banca	K	14,42	14,56	0,14	0,99%	> 6 %	17,32	17,03	-0,29	-1,69%	> 8%	6,35	5,51	-0,84	-13,26%	> 3%	-13,81	-13,38	0,43	3,13%	1,02	0,97	-0,05	-5,14%	0,8-1,0
Finecobank	K	17,84	24,12	6,28	35,19%	> 6 %	24,32	38,88	14,55	59,83%	> 8%	3,22	4,88	1,66	51,47%	> 3%	1,95	2,07	0,12	6,38%	0,14	0,16	0,01	10,19%	0,8-1,0
Intesa Sanpaolo	K	13,99	15,70	1,71	12,25%	> 6 %	16,62	18,66	2,04	12,27%	> 8%	5,47	5,93	0,46	8,32%	> 3%	-5,05	-5,26	-0,21	-4,12%	1,19	1,15	-0,04	-3,49%	0,8-1,0
Unicredit	K	13,63	14,54	0,91	6,67%	> 6 %	16,21	19,44	3,23	19,92%	> 8%	6,84	6,56	-0,29	-4,17%	> 3%	-6,58	-4,29	2,29	34,83%	1,04	1,02	-0,01	-1,21%	0,8-1,0

Table 3.21 Capital ratios banking institution

Source: authors' calculations

The analysis of the banks' ability to financially cover assets with their means expressed by the leverage ratio showed that all banks comply with the minimum requirement of the Basle Accords (3%) (Bucalossi A. & Scalia A., 2016) even if, due to the increase in tangible assets more than proportionally to that of Tangible Equity, it decreased compared to the values found in 2019.

An examination of the net interbank position showed that only Banca Generali, Mediolanum and Finecobank had receivables from other banks over the related payables. In addition, the latter had a low loan-to-deposit ratio.

On the other hand, it analysed bank profitability mainly by considering four indicators: the Cost to Income ratio, the Operating Efficiency ratio, the ROA and the ROE.

Banking Institution	Sector	Cost to Income Ratio %					Operative Efficiency index %				ROA %				ROE %				
		2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	Level
Banca Generali	K	41,89	43,50	1,61	3,84%	60,40%	1,08	1,09	0,01	1,05%	1,49	1,38	-0,11	-7,38%	18,08	15,87	-2,20	-12,19%	>5%
Banca Mediolanum	K	18,15	-49,04	-67,19	-370,26%	60,40%	0,59	0,54	-0,05	-8,02%	0,36	0,33	-0,03	-8,33%	8,15	7,01	-1,14	-13,94%	>5%
Banco Bpm	K	66,74	66,68	-0,06	-0,09%	60,40%	0,80	0,70	-0,11	-13,19%	0,23	0,14	-0,09	-39,13%	5,24	0,86	-4,38	-83,60%	>5%
Bper Banca	K	70,24	68,64	-1,59	-2,27%	60,40%	0,95	0,96	0,00	0,23%	0,20	0,10	-0,10	-50,00%	2,21	2,16	-0,05	-2,24%	>5%
Finacobank	K	40,01	32,58	-7,42	-18,55%	60,40%	0,49	0,45	-0,04	-8,92%	0,74	0,92	0,18	24,32%	14,46	11,58	-2,88	-19,89%	>5%
Intesa Sanpaolo	K	47,63	53,03	5,40	11,35%	60,40%	0,59	0,59	0,00	-0,33%	0,44	0,32	-0,12	-27,27%	4,21	4,36	0,16	3,74%	>5%
Unicredit	K	53,50	57,76	4,26	7,96%	60,40%	0,60	0,55	-0,04	-7,33%	0,38	0,16	-0,22	-57,89%	5,70	3,63	-2,07	-36,35%	>5%

Table 3.22 Profitability ratios banking institution

Source: authors' calculations

The analysis of operating efficiency carried out with the cost-to-income ratio showed an improving value for Banco Bpm (66.68%), Bper Banca (68.24%) and Finacobank (32.58%). However, for the latter company, it was below the minimum value (60%). However, for all other banks, a deterioration in operational efficiency was found.

It assessed the core business by analysing the operating efficiency index, which showed that the average incidence of operating costs on assets was insignificant and, on average, 0.70%. For all banks, except Banca Generali and Bper Banca, this ratio decreased, thus making them more efficient. The improvements of Banca Mediolanum and Banco Bpm were significant, which, despite the increase in their activity, sustained cost reductions of -0.32% and -7.19%, respectively. At the same time, the deterioration of Banca Generali and Bper Banca should be attributed to an increase in operating costs more than proportional to assets.

On the other hand, the profitability analysis showed a decrease compared to 2019 for all companies except Finacobank, which recorded an improvement in ROA pari to 24.32%, justified by the increase in EBIT by 41.25%. On the other hand, Unicredit, Bper Banca and banco bpm are the banks with the lowest ability to generate income from operations; these suffered a drop in operating profit of 55.06%, 40.65% 34.65%, respectively.

Return on equity was adequate for only three banks: Banca Generali (15.87%), Finacobank (11.58%) and Banca Mediolanum (7.01%). By contrast, all the other banks recorded an ROE of less than 5% and deteriorating due to falling profits. The only bank that improved its return on equity was Intesa San Paolo, which went from 4.21% to 4.36%.

It was also considered essential to analyse the level of risk of the banks' activities using three indicators: the coverage ratio, credit risk and the cost of credit risk. The level of coverage of total loans, identified by the first indicator, showed an improvement for all banks except Generali. This improvement is mainly attributable to a decrease in outstanding loans or increased total loan loss provisions less than proportional to gross loans.

Banking Institution	Sector	Coverage Ratio %				Credit Risk %				Cost of Credit Risk %			
		2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%
Banca Generali	K	0,44	0,44	0,01	1,26%	0,48	0,38	-0,10	-19,96%	0,01	0,04	0,03	323,94%
Banca Mediolanum	K	0,46	0,46	-0,01	-1,36%	0,13	0,09	-0,04	-27,73%	0,03	0,03	0,00	12,91%
Banco Bpm	K	4,40	4,31	-0,09	-2,05%	1,36	1,43	0,07	5,17%	0,94	1,07	0,14	14,53%
Bper Banca	K	7,81	4,57	-3,24	-41,45%	3,06	2,29	-0,77	-25,15%	0,86	1,34	0,48	56,39%
Finacobank	K	0,58	0,53	-0,04	-7,66%	0,05	0,04	-0,01	-15,39%	0,03	0,03	0,00	15,00%
Intesa Sanpaolo	K	5,02	4,29	-0,73	-14,63%	1,79	1,59	-0,20	-11,33%	0,16	0,27	0,11	65,23%
Unicredit	K	4,79	3,71	-1,08	-22,59%	1,13	0,56	-0,57	-50,76%	0,16	0,56	0,40	254,20%

Table 3.23 Risk ratios banking institution

Source: authors' calculations

Also positive was the performance of the credit risk ratio, which decreased, thanks to the drop in impaired loans, for all companies except Bpm, which went from 1.36% to 1.43%.

Banking Institution	Sector	Liquidity Cover Ratio %					Not Stable Funding Ratio %				
		2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level
Banca Generali	K	441,00	>100			> 100	216,00	>100			> 100
Banca Mediolanum	K	>100	>100			> 100	>100	>100			> 100
Banco Bpm	K	150,21	193,00	42,79	28,49%	> 100	>100	>100			> 100
Bper Banca	K	174,50	161,80	-12,70	-7,28%	> 100	109,1	118,80			> 100
Firecobank	K	>100	>100			> 100	>100	>100			> 100
Intesa Sanpaolo	K	162,00	150,00	-12,00	-7,41%	> 100	>100	>100			> 100
Unicredit	K	>100	>100			> 100	>100	>100			> 100

Table 3.24 Current ratios banking institution

Source: authors' calculations

To cope with the loss of liquidity and customers' ability to repay, banks have set aside greater sums to deal with possible future losses, and this was highlighted by the study of the cost of credit risk, which revealed improvements for all banks: the most significant were those of Banca Generali (+324%) and Unicredit (+254%).

Satisfactory was the analysis of the banks' liquidity conducted using the ratios defined by the Basel Three Accord, i.e. LCR and NSTR. All the banks declared to have exceeded the minimum limit for both indicators, i.e. 100%. We can also state that the banks analysed have an adequate capacity to cover their outflows in the short term even though most of them sustained a decrease in the Liquidity Coverage Ratio.

Financial Institutions

The analysis of financial intermediaries was carried out using, as for banks, capital and income adequacy ratios and risk and liquidity analysis.

Financial institution	Sector	Leverage Ratio %				Posizione Interbancaria Netta %				Loan to Deposit Ratio				Index of rigidity of the uses %				Index of elasticity of uses %			
		2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%
Azimut Holding	K	-0,51	0,55	1,06	206,60%	-0,20	1,24	1,44	-708,03%	2,12	36,38	34,26	1617,30%	13,17	13,30	0,14	1,04%	86,83	86,70	-0,14	-0,16%
Exor	K	4,50	2,21	-2,29	-50,87%	n. d.	n. d.	n. d.	n. d.	1,04	1,20	0,16	15,38%	53,37	56,25	2,88	5,40%	46,63	43,75	-2,88	-6,18%
Nexi	K	-50,14	-94,22	-44,08	-87,92%	-21,58	-32,06	-10,48	48,56%	3,61	3,35	-0,25	-7,00%	87,87	86,73	-1,14	-1,30%	12,13	13,27	1,14	9,40%
Poste Italiane	K	3,28	3,28	0,00	0,00%	n. d.	n. d.	n. d.	n. d.	7,50	7,54	0,04	0,47%	83,80	83,99	0,19	0,23%	16,20	16,01	-0,19	-1,17%

Table 3.25 Capital ratios financial institution

Source: authors' calculations

The analysis of the capital composition led to heterogeneous results: Azimut has a flexible structure due to the significant presence of financial assets held for sale; Nexi and Poste Italiane, on the other hand, have a rigid structure, while Exor has an intermediate but still more rigid system compared to 2019.

The analysis of the leverage ratio showed a deterioration for Nexi and Exor. Of particular concern is the situation of Nexi, which, not being able to finance its activities with its means, must resort to third-party means. Instead, Azimut sustained a significant improvement, going from -0.51% to +0.55%.

The analysis of the interbank position showed an improvement for Azimut, which went from a debt situation (-0.20%) to a credit situation (+1.24%), while Nexi worsened its position concerning banks, going from -21.58% to -32.06%.

The study of the Loan to Deposit ratio showed an increasing value above 1, thus demonstrating intermediaries' ability to support their financial structure.

Financial institution	Sector	Cost to Income Ratio %				Operative Efficiency index %				ROA %				ROE %			
		2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%
Azimet Holding	K	27,50	30,16	2,66	9,67%	1,78	1,83	0,05	3,00%	2,55	2,34	-0,21	-8,24%	29,72	22,03	-7,69	-25,89%
Exor	K	83,60	91,78	8,18	9,78%	33,23	25,52	-7,71	-23,21%	2,50	-1,70	-4,20	-168,00%	16,95	-10,49	-27,44	-161,90%
Nexi	K	32,16	31,59	-0,57	-1,77%	2,76	2,29	-0,47	-17,07%	-0,65	1,01	1,66	255,38%	4,64	2,34	-2,29	-49,50%
Poste Italiane	K	73,54	78,26	4,72	6,42%	1,76	1,58	-0,17	-9,88%	0,47	0,30	-0,17	-36,17%	9,40	6,15	-3,25	-34,57%

Table 3.26 Profitability ratios financial institution

Source: authors' calculations

The analysis of the intermediaries' profitability was carried out using the same ratios as for the banks, the only difference being the Cost to Income Ratio. This indicator was calculated as the ratio of operating costs to operating revenues and was exceptionally high for Exor (91.78%) and Poste Italia (78.26%). Since the increase in this indicator was due to costs being reduced to a lesser extent than revenues, it is considered that these companies should adopt strategies aimed at improving business efficiency.

The operating efficiency index ascertained an improvement in core business management for all companies except Azimet, which sustained an increase in assets (+4.33%) less than proportional to operating costs (+7.46%). The most efficient was Exor, which recorded a decrease in the index of 7.71 percentage points.

All companies also experienced a deterioration in profitability due to the significant drop in EBIT. The lowest ROA was recorded by Exor (-1.70%) due to the negative Ebit in the first half of 2020, and the highest by Azimet (2.34%).

The return on equity, ROE, also fell sharply for all companies, and this was due to the drastic drop in profit for the year, sometimes showing losses such as, for example, Exor (-€3.9 million).

Also, these companies, faced with the increased probability of insolvency of their customers, increased their provisions to cover losses. However, the level of coverage is lower than that of banks due to the lower level of riskiness of the business carried out by these companies. Azimet's coverage level was 0.07%, while Nexi's was 0.39%.

Financial institution	Sector	Coverage Ratio %				Cost of Credit Risk for Financial Institutions %			
		2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%
Azimet Holding	K	n. d.	n. d.	n. d.	n. d.	0,06	0,07	0,01	25,21%
Exor	K	n. d.	n. d.	n. d.	n. d.	3,90	3,30	-0,60	-15,34%
Nexi	K	n. d.	n. d.	n. d.	n. d.	0,09	0,39	0,30	317,83%
Poste Italiane	K	21,91	21,08	-0,84	-3,81%	3,16	3,59	0,43	13,75%

Table 3.27 Risk ratios financial institution

Source: authors' calculations

The adequacy of the liquidity level was analysed using the following ratios: current test ratio and quick/acid test ratio. The analysis of the first indicator showed an excellent ability to pay short-term debts through liquidity obtained from existing assets by all the companies, except Poste Italiane. A value of less than 1, or 0.52, was found for this institution. Significant, however, was the improvement for Nexi, which went from 0.88 to 1.5. The quick/acid test ratio analysis showed similar results: an adequate level of liquidity for Exor, although influenced mainly by inventories and Azimet, and insufficient for Poste Italiane. On the other hand, a drastic drop in this indicator was found for Nexi (-81%), resulting in a value of 0.38.

Financial institution	Sector	Current Test Ratio					Quick/Acid Test Ratio				
		2019	2020	Diff.	Δ%	Level	2019	2020	Diff.	Δ%	Level
Azimet Holding	K	1,08	1,15	0,07	6,00%	>1	1,03	1,10	0,07	6,60%	>1
Exor	K	1,83	2,07	0,24	13,27%	>1	1,16	1,35	0,19	16,32%	>1
Nexi	K	0,88	1,50	0,63	71,45%	>1	2,06	0,38	-1,67	-81,32%	>1
Poste Italiane	K	0,51	0,52	0,01	2,10%	>1	0,51	0,52	0,01	2,05%	>1

Table 3.28 Current ratios financial institution

Source: authors' calculations

Insurance

The study of insurance companies was carried out using balance sheet, income and financial indicators specific to the insurance sector.

The analysis of the structure of the insurance companies led to the conclusion that both Generali assicurazioni and Unipol have a flexible structure.

Insurance Institution	Sector	Index of rigidity of the uses %				Index of elasticity of uses %				Financial-insurance leverage ratio				Investment coverage ratio %				Solvency Ratio %				
		2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	Level
Generali Assicurazioni	K	32,75	33,40	0,66	2,00%	67,25	66,60	-0,66	-0,97%	14,39	15,22	0,83	5,76%	6,30	5,96	-0,34	-5,37%	209,00	194,00	-15,00	-7,18%	99,50
Unipol	K	26,06	29,38	3,32	12,74%	73,94	70,62	-3,32	-4,49%	7,41	7,11	-0,30	-4,00%	12,02	12,50	0,49	4,04%	153,00	188,00	35,00	22,88%	99,50

Table 3.29 Capital ratios insurance institution

Source: authors' calculations

An analysis of the Solvency Ratio, which was over 99.5, showed that both insurers had ample capacity to meet current and future obligations through the use of equity.

Insurance Institution	Sector	ROE %				Profitability Index of insurance management %				Profitability index of financial management %			
		2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%	2019	2020	Diff.	Δ%
Generali Assicurazioni	K	6,80	3,29	-3,50	-51,56%	0,67	0,64	-0,04	-5,42%	2,14	-0,25	-2,39	-111,56%
Unipol	K	9,81	7,71	-2,09	-21,35%	1,03	1,03	0,00	0,04%	1,68	0,85	-0,82	-49,07%

Table 3.30 Profitability ratios insurance institution

Source: authors' calculations

Assurance leverage was found to be adequate for both insurers: Generali (15.22) had an improvement compared to 2019 due to the decrease in shareholders' equity and the increase in technical provisions, Unipol (7.11), on the other hand, suffered a decline due to the reduction of shareholders' equity more than proportionally to the increase in technical provisions.

Insurance companies' ability to cover total investments with equity was deficient: 5.96% for Generali and 12.50% for Unipol.

The profitability of insurance companies was analysed by considering: the underwriting profitability index, the financial management profitability index and the ROE.

The study of the first indicator made it possible to identify the level of profitability of operations, which was 0.64 for Generali and 1.03 for Unipol.

Insurance Institution	Sector	Liquidity ratio %			
		2019	2020	Diff.	Δ%
Generali Assicurazioni	K	1,21	1,48	0,27	22,32%
Unipol	K	0,22	1,21	0,99	445,00%

Table 3.31 Current ratios insurance institution

Source: authors' calculations

The level of profitability generated by financial management, on the other hand, fell for both insurers, recording a value of 0.85 for Unipol and -0.25% for Generali. This negative value is to be attributed to the significant loss incurred by the insurance company from financial activities.

Both insurers also experienced a decline in return on equity, recording 3.29% for Generali and 7.71% for Unipol..

Insurance Institution	Sector	Loss Ratio %					Expense Ratio %					Combined Ratio %					Speed of liquidation %			
		2019	2020	Diff.	$\Delta\%$	Level	2019	2020	Diff.	$\Delta\%$	Level	2019	2020	Diff.	$\Delta\%$	Level	2019	2020	Diff.	$\Delta\%$
Generali Assicurazioni	K	63,20	61,50	-1,70	-2,69%	40-60	28,60	27,90	-0,70	-2,45%	< 100	91,80	89,50	-2,30	-2,51%	< 100	n. d.	n. d.	n. d.	n. d.
Unipol	K	65,80	53,10	-12,70	-19,30%	40-60	27,40	27,40	0,00	0,00%	< 100	93,20	80,50	-12,70	-13,63%	< 100	68,70	69,20	0,50	0,73%

Table 3.32 Technical-Insurance Management ratios

Source: authors' calculations

On the other hand, the analysis of the liquidity ratio underlined, despite the improvement seen in 2020, the inability of insurers to respond promptly to their commitments through the use of immediate liquidity.

To better understand these insurers' profitability and operational efficiency, several technical insurance management indicators were examined: Loss Ratio, Expense Ratio, Combined Ratio and Speed of Settlement.

The analysis of the Ross ratio showed an improvement compared to 2019, with a drop of 19% for Unipol and 3% for Generali. However, the latter's situation remains worrying as it remains above 60%.

The operating costs to premiums collected are high: 80.50% for Unipol and 89.50% for Unipol Generali. The expense ratio is around 28%, indicating that the insurers are managing their operations efficiently. However, the combined ratio showed that although there was an improvement compared to 2019, both insurance groups do not have a large profit margin.

Operational efficiency is also examined by assessing the speed of settlement, determined as the reported to settled claims ratio. This indicator improved for Unipol from 68.70 to 69.20% but could not be calculated due to a lack of information.

In conclusion, it can therefore say that the companies belonging to the financial services macro-sector also suffered some of the consequences of the health emergency. The blockage of activities and the resulting crisis that hit households and businesses negatively impacted the profitability of financial companies, which recorded an average drop in ROAd of 20% and ROE of 26%. In addition, as a result of the loans provided to households and businesses, banks recorded an increase in loans of about 11.21% and in provisions to cover losses of over 70%. This inevitably increased the riskiness of the business.

4) CONCLUSIONS

The study conducted on the half-yearly data of the companies belonging to the industrial, non-financial and financial sectors showed that the health emergency did not cause the loss of business continuity for any of the companies analysed.

In particular, Altman's Z-score showed that the companies for which it identified a high risk of business distress in 2020 were already in a seriously distressed situation in 2019. However, this value worsened for some of these companies, causing an increase in risk and, thus, a corporate crisis probability.

On the other hand, the study of the warning indices identified by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) showed that none of the industrial and non-financial services companies was in such a critical situation that they did not meet the going concern requirement. And this is partly justified by the fact that the analysis was conducted on prospectuses of large companies for which no additional information was available that is considered fundamental by the National Council of Chartered Accountants and Accounting Experts (henceforth NCCAAE, Italian acronym CNDCEC) for the detection of corporate crisis such as the inability to meet one's obligations in the six months following the valuation, repeated payment delays or other causes of insolvency. The trends, however, identified by these indices are consistent with the findings of Altman's Z-score, which allows us to affirm their validity and believe that the alert indices could be used as new parameters for analysing corporate insolvency..

The analysis of banking, financial and insurance institutions carried out with the appropriate indicators also affirmed that there is no risk of insolvency for the entities studied.

However, the warning and financial indicators analysis identified the balance sheet items on which the health emergency had the most significant impact. The industrial companies significantly affected by the asset freeze and lockdown belonged to the furniture, automobile and components sectors. Their analysis revealed a drastic decrease in turnover, operating income, which sometimes reached negative values, and the result for the year. All this, combined with customers' financial difficulties, caused a contraction in the companies' liquidity, forcing them to aggravate their debt situation by requesting additional bank financing. However, the analysis also showed improvements for some industrial companies: chemical-pharmaceutical and electronics companies. The increase in their sales and consequently in their revenues and profits can be attributed to the importance of the products they offer in this particular historical moment where health and communication were the two central values protected.

In contrast, the study conducted on the non-financial services macro-sector companies did not reveal any significant impact due to the health emergency. Specifically, companies in the communication sector experienced a substantial increase in sales due to the increase in telephone calls between people and new internet contracts signed by families to allow parents to continue working in smart working mode and children to attend school.

Water, electricity and gas utilities experienced a reversal in demand. Following the shutdown of some activities and the lockdown, there was an increase in domestic consumption and a decrease in industrial consumption. The increase in domestic demand occurred to a lesser extent than the decrease in industrial consumption, which caused a general decline in sales and a slight reduction in EBIT and the result for the year.

A significant role was also played by banks and financial institutions, which, together with specific government measures, helped to provide more liquidity to households and small and medium-sized enterprises and provided more financing to large companies. All this impacted the financial statements of banking and financial institutions, which undoubtedly showed an increase in loans and provisions to cover possible losses.

Therefore, it can be argued that the consequences suffered by companies due to the pandemic differ depending on their sector. However, the study outlined here has shown that the companies belonging to the industrial macro-sector were the ones that suffered the most significant changes, as it was the only one to be directly affected by the closure of borders and thus the blocking of international trade.

In conclusion, it can say that in this situation of economic emergency, three things enabled companies to overcome this context: the financial resources available, a flexible company structure and efficient management. These characteristics were essential to easily and quickly adopt new strategies relating, for example, to the reorganisation of production activity and the acquisition of new market shares through the introduction of new products aimed at satisfying unique consumer needs. It is therefore assumed that small and medium-sized companies suffered most from the adverse effects of the pandemic, as they were unlikely to have these three elements.

In conclusion, it can say that in this situation of economic emergency, three things enabled companies to overcome this context: available financial resources, a flexible corporate structure and efficient management. These characteristics were essential to easily and quickly adopt new strategies relating, for example, to the reorganisation of production activity and the acquisition of new market shares through the introduction of new products aimed at satisfying unique consumer needs. It is therefore assumed that small and medium-sized enterprises suffered most from the adverse effects of the pandemic, as they are unlikely to have these three elements at their disposal.

To conclude, it should be particularly emphasised that, as noted at the outset, it also complements the research illustrated in this paper by comparing the results of the bankruptcy predictive alert indices and Altman's Z-score. It reached the trends identified by the alert indices with the results obtained from Altman's Z-score, and this comparison shows that the final results are similar. The comparison between the alert ratios illustrated by the National Council of Chartered Accountants and Accounting Experts. and the consequences of Altman's Z-score allows us to state two observations: undoubtedly, the alert ratios identified by the National Council of Chartered Accountants and Accounting Experts. are characterised by a high predictive validity regarding the bankruptcy of companies and, in addition, that these ratios lead to similar results to those that can obtain by applying Altman's Z-score. Therefore, it is possible to state that these alert ratios can be used as new parameters for analysing corporate insolvency not only at the Italian but also at the international level.

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